CHAPTER 3 APPENDIX A: SPECIES AND ENVIRONMENT SUPPLEMENTAL INFORMATION

A.1 Geology and Substrates

The soil associations identified within the shore-adjacent counties/parishes are described and summarized in Table A-1. Characteristics of each soil association and the county/parish where the soil association occurs are included.

Table A-1. Soil Associations Along the Gulf Coast

STATE	COUNTY / PARISH	SOIL ASSOCIATION	DESCRIPTION
Texas[a]	Orange, Jefferson, Liberty	Otanya-Kirbyville-Evadale	Formed on nearly level to steep, coastal plain uplands that are intricately dissected by streams. Parent materials are alluvial and marine sediments of Tertiary age. Soils occur on low-relief uplands and flat plains.
	Orange, Jefferson, Liberty, Chambers	Beaumont-League-Labelle	Formed in alluvial and marine sediments of primarily Quaternary age that were deposited under fluctuating sea level conditions. Soils occur in areas of low local relief and are dissected by rivers that flow to the Gulf of Mexico. Soils are well developed and clayey with high shrink-swell properties.
	Chambers, Liberty	Tinn-Trinity-Kaufman	Formed in alluvium on floodplains. Soils have clayey textures and high shrink-swell properties.
	Chambers, Liberty, Harris, Galveston, Brazoria, Matagorda	Lake Charles-Bernard-Edna	Formed in alluvial and marine sediment of primarily Quaternary age that were deposited under fluctuating sea level conditions. Soils occur in areas of low local relief and are dissected by rivers that flow to the Gulf of Mexico. Soils are well developed and clayey with high shrink-swell properties.
	Matagorda	Pledger-Brazoria-Norwood	Formed in alluvium on floodplains. Soils have clayey textures and high shrink-swell properties.
	Matagorda, Jackson, Victoria, Calhoun, Refugio, San Patricio	Laewest-Dacosta-Edna	Formed in alluvial and marine sediment of primarily Quaternary age that were deposited under fluctuating sea level conditions. Soils occur in areas of low local relief and are dissected by rivers that flow to the Gulf of Mexico. Soils are well developed and clayey with high shrink-swell properties.
	Refugio, San Patricio, Nueces, Kleberg	Victoria-Orelia-Edroy	Formed in alluvial and marine sediment of primarily Quaternary age that were deposited under fluctuating sea level conditions. Soils occur in areas of low local relief and are dissected by rivers that flow to the Gulf of Mexico. Soils are well developed and clayey with high shrink-swell properties.
	Kleberg, Kenedy, Willacy	Nueces-Sarita-Falfurrias	Formed on a broad coastal plain consisting of sediments of Tertiary and Quaternary age. Soils occur on nearly level land within the Rio Grande valley and are usually dissected by southeastward flowing streams. Soils are very deep, sandy soils on the sandsheet prairie that covers the southeast parts of the South Texas Coastal Plain.
Texas[a]	Cameron	McAllen-Hidalgo-Brennan	Formed on a broad coastal plain consisting of sediments of Tertiary and Quaternary age. Soils occur on nearly level to moderately sloping plains and broad ridges within the Rio Grande valley and are usually dissected by southeastward flowing streams. Soils are deep and very deep, well developed, loamy soils.
	Orange, Jefferson, Chambers, Harris, Galveston, Brazoria, & Matagorda	Harris-Surfside-Francitas	Formed in Quaternary sediments on nearly level coastal lowland plains, including marshes, tidal flats, and barrier islands. Soils can be described as saline and clayey.
	Calhoun, Aransas, Refugio, San Patricio, Nueces, Kleberg, Kenedey, Willacy & Cameron	Mustang-Daggerhill-Barrada	Soils can be described as sandy and usually occur on dunes on barrier island landscapes.
Louisiana[b]	St. Tammany	Guyton-Abita-Brimstone	Level to gently sloping, poorly drained and somewhat poorly drained soils that are loamy throughout.
		Myatt-Stough-Prentiss	Level and very gently sloping, poorly drained to moderately well drained soils that are loamy throughout.

Table A-1. Soil Associations Along the Gulf Coast

STATE	COUNTY / PARISH	SOIL ASSOCIATION	DESCRIPTION
		Cahaba-Prentiss-Latonia	Very gently sloping and level, well drained and moderately well drained soils that have a loamy surface layer and subsoil.
		Arkabula-Rosebloom	Nearly level, somewhat poorly drained and poorly drained soils that are loamy throughout.
		Ouchaita-Bibb	Nearly level, well drained and poorly drained soils that are loamy throughout.
		Larose-Allemands-Kenner	Level, very poorly drained soils that have a mucky surface layer and clayey and mucky underlying material, in freshwater marshes.
		Arat	Level, very poorly drained soils that are loamy throughout, in swamps.
		Clovelly-Lafitte	Level, very poorly drained soils that have a mucky surface layer and clayey and mucky underlying material, in brackish marshes.
		Barbary-Maurepas	Level, very poorly drained soils that are clayey or mucky throughout, in swamps.
	Orleans	Clovelly-Lafitte-Gentilly	Level, very poorly drained soils that have a moderately thick, thick, or thin mucky surface layer and clayey underlying material.
		Aquents	Level, poorly drained soils that are stratified and clayey to mucky throughout.
	St. Bernard	Clovelly-Lafitte	Level, very poorly drained soils that have a mucky surface layer and clayey and mucky underlying material, in brackish marshes.
Louisiana[b]		Timbalier-Bellpass	Level, very poorly drained soils that have a thick or moderately thick mucky surface layer and layer underlying material, in saline marshes.
		Scatlake	Level, very poorly drained soils that are clayey throughout, in saline marshes.
		Fausse	Level, very poorly drained soils that are clayey throughout, in saline marshes.
	Plaquemines	Balize-Larose	Level, very poorly drained soils that are loamy throughout or that have a thin mucky surface layer and clayey underlying material; in freshwater marshes.
		Clovelly-Lafitte-Gentilly	Level, very poorly drained soils that have a moderately thick, thick, or thin mucky surface layer and clayey underlying material.
		Timbalier-Bellpass	Level, very poorly drained soils that have a thick or moderately thick mucky surface layer and layer underlying material, in saline marshes.
		Scatlake	Level, very poorly drained soils that are clayey throughout, in saline marshes.
		Aquents	Level, poorly drained soils that are stratified and clayey to mucky throughout.
		Felicity	Gently undulating somewhat poorly drained soils that are sandy throughout.
	Jefferson	Clovelly-Lafitte	Level, very poorly drained soils that have a mucky surface layer and clayey and mucky underlying material, in brackish marshes.
		Timbalier-Scatlake	Level, very poorly drained soils that have a thick or thin mucky surface layer and clayey underlying material, in saline marshes.
		Scatlake	Level, very poorly drained soils that are clayey throughout, in saline marshes.
		Felicity	Gently undulating somewhat poorly drained soils that are sandy throughout.
	Tangipahoa	Maurepas	Level, very poorly drained, organic soils that are mucky throughout..
		Guyton-Abita	Level to gently sloping, poorly drained and somewhat poorly drained soils that are loamy throughout.
		Toula-Tangi	Very gently sloping and moderately sloping, moderately well drained soils that have a loamy surface layer and a loamy and clayey subsoil.

Table A-1. Soil Associations Along the Gulf Coast

STATE	COUNTY / PARISH	SOIL ASSOCIATION	DESCRIPTION
		Tangi-Ruston-Smithdale	Very gently sloping to moderately steep, moderately well drained and well drained soils hat have a loamy surface layer and a loamy and clayey subsoil.
	St. Charles	Kenner-Allemands	Level, very poorly drained soils that have a mucky or clayey surface layer and mucky and clayey underlying material. Commonly found in freshwater marshes.
		Barbary-Fausse	Level, very poorly drained soils that have a mucky or clayey surface layer and clayey underlying material, in swamps.
		Commerce-Sharkey	Level, somewhat poorly drained and poorly drained soils that are loamy throughout or have a loamy or clayey surface layer and a clayey subsoil.
Louisiana[b]	St. John the Baptist	Barbary	Level, very poorly drained soils that have a mucky surface layer and clayey underlying material
		Kenner-Allemands-Carlin	Level, very poorly drained soils that have a mucky organic surface layer and mucky or clayey underlying material.
		Cancienne-Carville	Level, somewhat poorly drained soils that have a loamy surface layer and a clayey subsoil or that is loamy throughout.
	Livingston	Calhoun-Toula-Bude	Level and gently sloping, poorly drained, moderately well drained, and somewhat poorly drained soils that are loamy throughout.
		Cloyell-Springfield-Encrow	Gently sloping and level, somewhat poorly drained and poorly drained soils that have a loamy surface layer and a loamy and clayey subsoil.
		Gilbert-Satsuma	Level and gently sloping, poorly drained and somewhat poorly drained soils that are loamy throughout.
		Myatt-Satsuma	Level and gently sloping, poorly drained and somewhat poorly drained soils that are loamy throughout.
		Myatt-Stough	Level, poorly drained and somewhat poorly drained soils that are loamy throughout.
	Lafourche	Timbalier-Bellpass	Level, very poorly drained soils that have a thick or moderately thick mucky surface layer and layer underlying material, in saline marshes.
		Scatlake	Level, very poorly drained soils that are clayey throughout, in saline marshes.
	St. James	Barbary-Sharkey	Frequently flooded, clayey soils.
		Sharkey	Clayey soils.
		Commerce-Sharkey	Level, somewhat poorly drained and poorly drained soils that are loamy throughout or have a loamy or clayey surface layer and a clayey subsoil.
	Terrebonne	Mhoon-Commerce	Level, somewhat poorly drained soils that are loamy throughout.
		Sharkey-Swamp	Dark colored, poorly drained soils made up of slack-water clays.
		Swamp	Level, poorly drained to very poorly drained, made up of mixed soils in drainageways, small swamps, and large swampy areas. Top layer commonly made up of sand to sandy loam.
		Marsh	Level, very poorly drained soils that have a mucky surface layer and a mucky or clayey underlying material.
	Assumption	Barbary	Level, very poorly drained, nearly continuously flooded, clayey soils.
		Commerce	Nearly level, somewhat poorly drained soils that are loamy throughout.
		Sharkey	Level, poorly drained, clayey soils.
		Fausse-Sharkey	Level, very poorly drained and poorly drained, frequently flooded, clayey soils.

Table A-1. Soil Associations Along the Gulf Coast

STATE	COUNTY / PARISH	SOIL ASSOCIATION	DESCRIPTION
Louisiana[b]	St. Mary	Barbary-Maurepas-Fausse	Level, very poorly drained soils that are clayey or mucky throughout, in swamps.
		Larose-Allemands-Kenner	Level, very poorly drained soils that have a mucky surface layer and clayey and mucky underlying material, in freshwater marshes.
	St. Martin	Fausse	Level, clayey soils that are inside the Atchafalaya Basin Floodway on the alluvial plain.
		Convent	Nearly level, loamy soils that are inside the Atchafalaya Basin Floodway on the alluvial plain.
		Sharkey-Baldwin-Iberia	Level to gently undulating, mainly clayey soils on the alluvial plain.
	Iberia	Placedo	Very poorly drained clayey soils of the firm marshes.
		Scatlake	Level, very poorly drained soils that are clayey throughout, in saline marshes.
		Lafitte	Very poorly drained organic soils of the soft marshes.
		Maurepas	Very poorly drained organic soils of the tidal swamps and soft marshes.
	Vermilion	Clovelly-Lafitte	Level, very poorly drained soils that have a mucky surface layer and clayey and mucky underlying material, in brackish marshes.
		Bancker-Creole	Level very poorly drained soils that have a mucky surface layer and a clayey underlying material; in brackish marshes.
		Scatlake	Level, very poorly drained soils that are clayey throughout, in saline marshes.
		Mermentau-Hackberry	Level and gently undulating, poorly drained and somewhat poorly drained soils that have a clayey or loamy surface layer, a clayey, sandy, or loamy subsoil, and a loamy or sandy substratum.
	Cameron	Creole	Level, very poorly drained soils that have a very fluid, mucky surface layer and slightly fluid and very fluid clayey, sandy, and loamy underlying material; in brackish marshes.
		Bancker	Level very poorly drained soils that have a very fluid, mucky surface layer and very fluid, clayey underlying material; in brackish marshes.
		Scatlake	Level, very poorly drained soils that are clayey throughout, in saline marshes.
		Clovelly	Level, very poorly drained soils that have a very fluid, mucky surface layer, and a very fluid, mucky and clayey underlying material; in brackish marshes.
		Mermentau-Hackberry	Level and gently undulating, poorly drained and somewhat poorly drained soils that have a clayey or loamy surface layer, a clayey, sandy, or loamy subsoil, and a loamy or sandy substratum.
Louisiana[b]		Udifluvents-Aquents	Level to moderately steep soils that are stratified and sandy to clayey throughout.
	Calcasieu	Mowata-Vidrine-Crowley	Level and very gently sloping, poorly drained and somewhat poorly drained soils that have a loamy surface layer and a loamy and clayey subsoil.
		Morey-Leton-Mowata	Level, poorly drained soils that have a loamy surface layer and a loamy or loamy and clayey subsoil.
		Kinder-Messen-Guyton	Level to moderately sloping, poorly drained and moderately well drained soils that are loamy throughout.

Table A-1. Soil Associations Along the Gulf Coast

STATE	COUNTY / PARISH	SOIL ASSOCIATION	DESCRIPTION
Mississippi[c]	Jackson	Eustis-Wadley-Benndale	Dominantly nearly level to strongly sloping, somewhat excessively drained soils that have a sandy surface layer and a sandy or loamy subsoil and well drained soils that have a loamy surface layer and a loamy subsoil; on uplands.
		Bayou-Daleville-Lenoir	Dominantly level and nearly level, poorly drained soils that have a loamy surface layer and a loamy subsoil and somewhat poorly drained soils that have a loamy surface layer and a clayey subsoil; on terraces.
		Handsboro-Axis-Maurepas	Dominantly level, very poorly drained soils that have a surface layer of mucky silt loam, mucky sandy clay loam, or muck and a substratum of muck or a loamy substratum; in tidal marshes, coastal floodplains, and swamps.
		Harleston-Escambia-Bayou	Dominantly nearly level to moderately sloping, moderately well drained, somewhat poorly drained, and poorly drained soils that have a loamy surface layer and a loamy subsoil; on uplands.
		Duckston-Newhan-Corolla	Dominantly nearly level to rolling, poorly drained, excessively drained, and somewhat poorly drained soils that are sandy throughout; on barrier islands.
	Harrison	Eustis-Latonia-Lakeland	Somewhat excessively drained and excessively drained soils that are sandy throughout and well drained soils that have a loamy subsoil.
		Smithton-Plummer	Poorly drained soils that have a loamy subsoil.
		Atmore-Harleston-Plummer	Poorly drained and moderately well drained soils that have a loamy subsoil.
Mississippi[c]	Harrison	Poarch-Plummer-Ocilla	Well-drained, somewhat poorly drained, and poorly drained soils that have a loamy subsoil.
		Harleston-Smithton-Nugent	Moderately well drained and poorly drained soils that have a loamy subsoil and excessively drained soils that are stratified with sandy and loamy material.
		Poarch-Atmore-Harleston	Well-drained soils on broad ridgetops, poorly drained soils on low wet flats, and moderately well drained soils on low ridges.
		Ruston-McLaurin-Saucier	Well drained and moderately well drained soils on broad ridges and short side slopes.
		Saucier-Poarch-Atmore	Well-drained to poorly drained soils on broad ridges and narrow side slopes.
		Handsboro	Very poorly drained organic soils.
		Handsboro-St. Lucie	Very poorly drained organic soils and excessively drained sandy soils.
	Hancock	Atmore-Beauregard-Escambia	Nearly level to gently sloping, moderately well drained to poorly drained silty and loamy soils on broad wet upland flats and low ridges.
		Atmore-Smithton-Escambia	Nearly level to gently sloping, poorly drained and somewhat poorly drained silty and loamy soils on broad wet upland flats and drainageways, and low upland ridges.
		Guyton-Atmore-Trebloc	Nearly level, very poorly drained silty soils on broad wet flats and drainageways.
		Handsboro-Bohicket	Nearly level, very poorly drained, mucky and clayey on tidal marshes that are flooded daily by tidal waters.
Alabama[d]	Baldwin	Marlboro-Faceville-Greenville	Deep, moderately well drained and well drained, level to gently sloping upland soils.
		Lakeland-Plummer	Deep, somewhat excessively drained to very poorly drained, level bottomland soils, level to moderately steep upland soils.
		Norfolk-Klej-Goldsboro	Deep, moderately well drained and well drained, level to gently sloping upland soils.

Table A-1. Soil Associations Along the Gulf Coast

STATE	COUNTY / PARISH	SOIL ASSOCIATION	DESCRIPTION
		Lakewood-St. Lucie-Leon	Moderately deep and deep, poorly drained to excessively drained soils that border saltwater and freshwater lakes.
	Mobile	Troup-Heidel-Blama	Nearly level to undulating, well drained soils that have loamy subsoils, formed in loamy, marine sediments.
	Mobile	Dorovan-Johnston-Levy	Nearly level to hilly, very poorly drained, mucky and loamy soils, formed in thick deposit of organic residues and alluvial sediments on bottomlands.
Alabama[d]		Notcher-Saucier-Malbis	Nearly level to gently undulating, moderately well drained soils that have loamy and clayey subsoils, formed in loamy and clayey marine and alluvial sediments on terraces.
		Bayou-Scambia-Harleston	Nearly level to gently undulating, poorly to moderately well drained soils with loamy subsoils, formed in marine and fluvial sediments on uplands and terraces.
		Axis-Lafitte	Nearly level, very poorly drained, loamy mineral and organic soils, formed in loamy marine sediments and thick herbaceous plant remains on coastal marshes.
		Urban land-Smithton-Benndale	Nearly level to gently rolling Urban land areas that are intermingled with poorly drained and well drained soils that have loamy subsoils, formed in loamy marine and fluvial sediments on uplands.
Florida[e]	Monroe	Tidal Marsh-Coastal Beach-Coastal Dune	Regularly flooded organic and mineral deposits and unstable sands along the seashore.
	Collier	St. Lucie-Lakewood-Pamello	Excessively drained soils, solid predominantly thick acid sand.
		Leon-Immakalee-Pompano	Somewhat poorly drained soils, soil predominantly thick acid sands with organic pans, interspersed with soil without pan formation.
		Adamsville-Pompano	Somewhat poorly drained soils, soil predominantly thick to thin sands overlying finer textured alkaline materials.
		Pompano-Charlotte-Delray	Poorly to very poorly drained soils, soils predominantly moderately thick to thin sands to sandy loams overlying finer textured alkaline materials.
		Tidal Marsh-Coastal Beach-Coastal Dune	Regularly flooded organic and mineral deposits and unstable sands along the seashore.
		Freshwater Swamp-Marsh[f]	Regularly flooded, very poorly drained soils with high organic and mineral deposits.
	Lee-Hillsborough	Leon-Immakalee-Pompano	Somewhat poorly drained soils, soil predominantly thick acid sands with organic pans, interspersed with soil without pan formation.
	Lee-Hillsborough	Leon-Pomello-Plummer	Somewhat poorly drained soils, soil predominantly thick acid sands with organic pans, interspersed with soil without pan formation.
		Leon-Blanton-Plummer	Somewhat poorly drained soils, soil predominantly thick acid sands with organic pans, interspersed with soil without pan formation.
		Adamsville-Pompano	Somewhat poorly drained soils, soil predominantly thick to thin sands overlying finer textured alkaline materials.
Florida[e]		Broward-Parkwood-Keri	Somewhat poorly drained soils, soil predominantly thick to thin sands overlying finer textured alkaline materials.
		Pompano-Charlotte-Delray	Poorly to very poorly drained soils, soils predominantly moderately thick to thin sands to sandy loams overlying finer textured alkaline materials.

Table A-1. Soil Associations Along the Gulf Coast

STATE	COUNTY / PARISH	SOIL ASSOCIATION	DESCRIPTION
		Tidal Marsh-Coastal Beach-Coastal Dune	Regularly flooded organic and mineral deposits and unstable sands along the seashore.
	Pasco-Citrus	Lakeland-Eustis-Blanton	Well drained to moderately well drained soils predominantly thick to moderately thick acid sands.
		Arredondo-Gainesville-Fort Meade	Well drained to moderately well drained soils predominantly thick to thin phosphatic sand and loamy sands overlying finer textured materials.
		Blanton-Klej	Well drained to moderately well drained soils predominantly thick to thin acid sands some of which overlie finer textured subsoils.
		Rex-Blanton	Well drained to moderately well drained soils predominantly thick to thin acid sands some of which overlie finer textured subsoils.
		Leon-Plummer-Rullege	Somewhat poorly drained soils, soil predominantly thick acid sands with organic pans, interspersed with soil without pan formation.
		Plummer-Rullege	Poorly to very poorly drained soils, soils predominantly thick to thin sandy loam surface soils overlying finer textured acid subsoils.
		Tidal Marsh-Coastal Beach-Coastal Dune	Regularly flooded organic and mineral deposits and unstable sands along the seashore.
		Freshwater Swamp-Marshf	Regularly flooded, very poorly drained soils with high organic and mineral deposits.
	Marion	Jonesville-Chiefland-Hernando	Well drained to moderately well drained soils predominantly thick to thin sands influenced by alkaline materials.
	Marion	Arredondo-Gainesville-Fort Meade	Well drained to moderately well drained soils predominantly thick to thin phosphatic sand and loamy sands overlying finer textured materials.
	Levy-Wakulla	Lakeland-Eustis-Blanton	Well drained to moderately well drained soils predominantly thick to moderately thick acid sands.
		Jonesville-Chiefland-Hernando	Well drained to moderately well drained soils predominantly thick to thin sands influenced by alkaline materials.
Florida[e]		Arredondo-Gainesville-Fort Meade	Well drained to moderately well drained soils predominantly thick to thin phosphatic sand and loamy sands overlying finer textured materials.
		Blanton-Klej	Well drained to moderately well drained soils predominantly thick to thin acid sands some of which overlie finer textured subsoils.
		Rex-Blanton	Well drained to moderately well drained soils predominantly thick to thin acid sands some of which overlie finer textured subsoils.
		Leon-Plummer-Rullege	Somewhat poorly drained soils, soil predominantly thick acid sands with organic pans, interspersed with soil without pan formation.
		Plummer-Rullege	Poorly to very poorly drained soils, soils predominantly thick to thin sandy loam surface soils overlying finer textured acid subsoils.
		Manatee-Felda	Poorly to very poorly drained soils, soils predominantly moderately thick to thin sands to sandy loams overlying finer textured alkaline materials.
		Norfolk-Ruston-Orangeburg	Well-drained, undulating, upland soils with loamy fine sand surface soils and sandy clay loam subsoils.

Table A-1. Soil Associations Along the Gulf Coast

STATE	COUNTY / PARISH	SOIL ASSOCIATION	DESCRIPTION
		Kanapaha-Blanton	Well drained to moderately well drained soils predominantly thick to thin acid sands some of which overlie finer textured subsoils.
	Franklin-Escambia	Lakeland-Eustis-Blanton	Well drained to moderately well drained soils predominantly thick to moderately thick acid sands.
		Lakeland-Eustis-Norfolk	Well drained to moderately well drained soils predominantly thick to moderately thick acid sands.
		Blanton-Klej	Well drained to moderately well drained soils predominantly thick to thin acid sands some of which overlie finer textured subsoils.
	Franklin-Escambia	Norfolk-Ruston-Orangeburg	Well-drained, undulating, upland soils with loamy fine sand surface soils and sandy clay loam subsoils.
		Magnolia-Faceville-Tifton	Well-drained undulating, upland soils, with loamy sand surface soils and fine sand to clay loam to fine sand clay subsoils.
		Shubuta-Cuthbert-Lakeland	Excessively drained to moderately well drained, sloping to very steep coarse sands, loamy sands, and sandy clay loams of the uplands that have a sandy clay to clay subsoil.
		Leon-Blanton-Plummer	Somewhat poorly drained soils, soil predominantly thick acid sands with organic pans, interspersed with soil without pan formation.
		Scranton-Ona	Somewhat poorly drained soils predominantly thick acid sands with dark surface soils.
Florida[e]		Goldsboro-Lynchburg	Well drained to moderately well drained soils predominantly thick to thin acid sands some of which overlie finer textured subsoils.
		Plummer-Rullege	Poorly to very poorly drained soils, soils predominantly thick to thin sandy loam surface soils overlying finer textured acid subsoils.
		Tidal Marsh-Coastal Beach-Coastal Dune	Regularly flooded organic and mineral deposits and unstable sands along the seashore.
		Freshwater Swamp-Marsh[f]	Regularly flooded, very poorly drained soils with high organic and mineral deposits.

[a] NRCS 2008.
[b] NRCS n.d.a.
[c] NRCS n.d.b.
[d] NRCS n.d.c.
[e] NRCS n.d.d.
[f] This description is based on characteristics of similar soil types and professional knowledge of soil characteristics common in freshwater swamps and marshes.

A.2 Essential Fish Habitat in Coastal Wetlands

Essential fish habitat for red drum, reef fish, and coastal migratory pelagic species are included in Figure 3-5.

Red Drum

Red drum is a demersal species that occur throughout the Gulf in a variety of habitats, ranging from depths of about 230 feet offshore to very shallow estuarine waters (GMFMC 2004). They commonly occur in virtually all of the Gulf's estuaries where they occur over a variety of substrates including seagrasses, sand, mud, and oyster reefs. Red drum tolerate salinities ranging from freshwater to highly saline water. Spawning occurs near the mouths of bays and inlets, and on the Gulf side of barrier islands. Eggs hatch mainly in the Gulf, and larvae are transported into estuaries where they mature before moving back to the Gulf. Estuarine wetlands, which include tidal wetlands, salt marshes, and tidal creeks, are especially important to larval, juvenile, and sub-adult red drum.

Harvest of red drum in the Exclusive Economic Zone is currently set to zero by the red drum FMP (GMFMC and NOAA 2011). Recreational harvest of red drum is allowed in State waters as regulated by each state.

Shrimp

Brown Shrimp

Brown shrimp are found along the Atlantic Coast from Massachusetts to Florida and within the Gulf of Mexico from Florida through the Yucatan Peninsula.

This species spawns at depths greater than 25 feet. Brown shrimp in the Gulf of Mexico spawn in spring and summer at water temperatures between 62.6 and 84.2 degrees Fahrenheit (°F). Adult brown shrimp are thought to die after spawning once (St. Amant et al. 1966 as cited in Larson et al. 1989). Postlarval brown shrimp move into shallow, low salinity areas with marsh grass in estuaries after water temperatures reach 51.8°F. Juvenile brown shrimp inhabit nursery areas and gradually move to deeper and higher salinity areas as they grow. Adult brown shrimp move seasonally with changes to water temperatures.

Brown shrimp are omnivorous and food sources include detritus, small invertebrates, and fish depending on the life stage of the shrimp. Carnivorous fishes and crustaceans feed on brown shrimp. Competition between brown shrimp and two other commercially important shrimp species, pink and white shrimp, is considered minor because the species have different preferred substrate and salinity preferences and temporal differences in habitat use. Each species also exhibits differences in diurnal activity (NOAA Fisheries Service 2011b).

Pink Shrimp

Pink shrimp are found from the lower Chesapeake Bay to Florida long the Atlantic Coast and in the Gulf of Mexico from Florida to approximately Isla Mujeres, Mexico. The species is most abundant in estuaries, bays, and broad, shallow continental shelf waters. The highest densities of pink shrimp are found within the Gulf of Mexico along the Florida and Yucatan, Mexico, coasts.

Pink shrimp move from shallow coastal nursery grounds to deeper waters as juveniles or early adults. Spawning then occurs in oceanic waters at depths of 13 to 157 feet, and sometimes deeper water. Pink shrimp can spawn all year: however, activity increases as water temperature rises. Peaks in spawning occur in late spring, summer, and early fall (TPWD 2002). Spawning moves from shallower waters to deeper waters as water temperature decreases. Postlarval life stages move into coastal nursery areas and concentrate in areas with shelter for shrimp. They spend between 2 and 6 months in these nursery areas, developing into juvenile and adult shrimp, before moving into offshore waters at depths between 30 and 144 feet (NOAA Fisheries Service 2011c).

Pink shrimp are found in areas with substrates consisting of shell-sand, sand, coral-mud, or mud. Sub-adult life stages prefer shell-sand and loose peat. Adult pink shrimp prefer calcareous sediments and also use hard sand substrate.

Pink shrimp are omnivores and feed on primarily benthic prey. Juveniles and young adults forage along the bottom in seagrass beds. This foraging activity generally occurs at night, but does occasionally occur during the day. Primary food sources change with life stage. Postlarvae feed on microplankton cultures and nauplii. Juvenile pink shrimp feed on dinoflagellates, foraminiferans, nematodes, polychaetes, ostracods, copepods, mysids, isopods, amphipods, caridean shrimp and eggs, and mollusks. Adult shrimp prey upon foraminiferans, gastropods, squid, annelids, crustaceans, small fish, and plants (NOAA Fisheries Service 2011c).

Pink shrimp are prey for birds and fish (including snook, spotted sea trout, and mangrove snapper or grey snapper, and reef fish species). They have also been found in the digestive tracts of dolphins. Pink shrimp habitat overlaps with brown and white shrimp. However, there are temporal differences and different environmental conditions preferred for the peak use of habitat areas for each species.

White Shrimp

White shrimp are distributed along the Atlantic Coast from New York to Florida. They are also found in the Gulf of Mexico from Apalachee Bay, Florida, to Ciudad Campeche, Mexico. This species is typically found in water less than 100 feet deep.

White shrimp spawn from March to November, though most commonly they spawn between April and October. Rising temperatures at the bottom of the water column trigger the beginning of the spawning season, and decreasing water temperatures in the fall occur at the same time as the end of spawning. Spawning occurs at salinities of 27 parts per thousand or greater and at depths of 26 to 102 feet (NOAA Fisheries Service 2011d).

White shrimp are larvae for approximately 10 days. During this life stage they are planktonic. Postlarvae move from oceanic areas into estuaries. Larval shrimp feed on zooplankton and phytoplankton. Juvenile shrimp are also found in estuaries, and tend to move further upstream within the estuaries than juvenile pink or brown shrimp. In Florida, juvenile white shrimp are found as far as 130 miles upstream from the estuary system; in Louisiana, they are found as far as 100 miles upstream. Juvenile white shrimp also prefer muddier substrates within loose peat and sandy mud (NOAA Fisheries Service 2011d).

Adult white shrimp prefer shallow muddy-bottom substrate. Both adult and juvenile white shrimp are benthic omnivores. Adults consume detritus, plant material, microorganisms, macroinvertebrates, and fish parts. This species serves as prey for many fish species and other marine and estuarine organisms.

A.3 Submerged Aquatic Vegetation

This section provides species descriptions for seven seagrass species found in the Gulf of Mexico.

Seagrasses

Manatee Grass

Manatee grass (*Syringodium filiforme*), a favorite food of the Florida manatee, is found in tropical coastal waters with salinities of 20 to 36 parts per thousand. Manatee grass commonly occurs growing with other species of seagrasses, or alone in small patches (Florida Museum of Natural History 2012). Manatee grass has grass blades that are long and thin, light green, and up to 3 feet in length. Like other seagrasses, this grass has inconspicuous flowers. Manatee grass propagates by rhizome extension and often mixes with turtle grass in seagrass meadows (U.S. Environmental Protection Agency [EPA] 2006). Manatee grass is found mostly in subtidal environments and may have a large understory of macroalgae. Manatee grass occurs mainly in south Texas and Florida (Gulf of Mexico Program [GMP] 2004). It also occurs in a few locations in eastern Louisiana and eastern Mississippi (USDA 2012a).

Shoal Grass

Shoal grass (*Halodule wrightii*) occupies the shallowest waters in the Gulf of Mexico and is often exposed during low tides (eFloras 2012). It is an early colonizer of vegetated areas and usually grows in water too shallow for other seagrass species except widgeon grass (Florida Department of Environmental Protection 2011). Shoal grass has elongate stalks that often branch into flat, wide leaves with a maximum width of 0.125 inch. These stalks may grow to 15 to 16 inches in length. They have a naturally ragged, somewhat three-pointed tip on the leaf. This plant inhabits very shallow areas and generally occurs in water less than 20 inches deep. While shoal grass beds can grow on both the landward and ocean sides of turtle grass beds, they are usually found on the landward side (U.S. EPA 2006). However, they can also grow in monospecific beds and not be associated with turtle grass. Sandy and muddy substrates are the most common habitat for shoal grass, but they can also be found adjacent to coral reefs and in mangrove swamps. Shoal grass is widely distributed throughout the Gulf of Mexico, with significant populations found in many coastal bays and estuaries (GMP 2004).

Turtle Grass

The common name for turtle grass refers to the green sea turtles that graze on large fields of this seagrass (Florida Museum of Natural History 2012). Turtle grass (*Thalassia testudiunum*) meadows are highly productive and play an important role in estuarine and near coastal ecosystems (U.S. EPA 2006). Turtle grass plants have broad, strap-like blades that range from 4 to 30 inches in length (GMP 2004). These plants reproduce asexually by creeping rhizomes or sexually by waterborne flower pollen and form dense meadows in estuaries or near coastlines (U.S. EPA 2006). Turtle grass is often found just below the low tide surface to depths of 100 feet in clearer waters. It prefers mud or sand substrate for colonization and has rhizomes that may be as deep as 10 inches below the substrate surface. Turtle grass is the most abundant and widely distributed seagrass in the Gulf of Mexico and can often be found in dense, extensive stands (GMP 2004).

Widgeon Grass

Widgeon grass (*Ruppia maritima*) (also known as ditch grass) grows in both freshwater and saline environments due to its abilities to withstand a wide range of salinities. Not generally considered a "true" seagrass, widgeon grass is primarily found in brackish bays and estuaries (Duke and Kruczynski 1992; U.S. EPA 2006). Widgeon grass leaves are needlelike, short, about 2 inches in length, and branch off of slender, elastic stems. This seagrass reproduces sexually through hydroanemophilous pollination, which leads to the production of tiny, inconspicuous flowers and seeds found on its stalks. It can also reproduce asexually by means of rhizomes which extend along the estuary bottom and send out shoots. Widgeon grass, because of its nutritive value, is an extremely important SAV species for many waterfowl species including the American widgeon, for which the plant is named (U.S. EPA 2006). Widgeon grass is the most common seagrass in parts of the Gulf of Mexico estuaries most influenced by freshwater (GMP 2004). It can form extensive SAV beds in subtidal areas, withstanding exposure to sun and some desiccation (Florida Museum of Natural History 2012).

Paddle Grass

Paddle grass (*Halophila decipiens*) is a small seagrass species that usually stands 1.2 to 2 inches tall. It has thin, oval blades in pairs that appear translucent to the eye. Rhizomes are often located near the surface and exposed to the water column. Paddle grass is easily uprooted due to its shallow rhizome structure and typically grows at depths between 33 and 100 feet. This seagrass species requires less light than other seagrasses and can be found in turbid areas and below docks. It is found mostly in the warmer waters of the Gulf of Mexico and extensive acreages of seasonal beds have been observed in southern Florida (GMP 2004).

Star Grass

Star grass (*Halophila engelmanni*) is found throughout the Gulf of Mexico (Green and Short 2003) and has similar physical characteristics to paddle grass (GMP 2004). It is a very small plant of shallow saline waters that rarely exceeds 4 inches in height. Salinity tolerance may vary but generally ranges from 20 to over 35 parts per thousand (Barataria Terrebonne National Estuary Program 2012). Star grass is found in sheltered sites from low-spring tide level up to 300 feet in clear waters. It is generally found in sandy and muddy substrates but can also be found in areas with gravel or rock bottom.

Water Celery

Water celery (*Valliseneria Americana*), also referred to as eel grass, is a dominant SAV along the bays and estuaries of the Northern Gulf of Mexico in brackish (up to 12-15 ppt) and fresh waters. Wild celery seems to prefer coarse silty to sandy soils, and is fairly tolerant of murky waters and high nutrient loading. It can tolerate wave action better than some other bay grass species. Like other SAV, water celery provides habitat and nursery areas for fish and shellfish. It is also a highly important food source for waterfowl, especially diving ducks such as canvasbacks, scaup and redheads.

A.4 Federally Listed Fish Species

Smalltooth Sawfish – Endangered

Smalltooth sawfish is a cartilaginous, shark-like ray that is listed as endangered. Sawfishes have long, toothed snouts that look similar to a saw. They are long-lived, slow growing, slow to mature, and bear

few young. These traits make all sawfish extremely vulnerable to overfishing and slow to recover from depletion (NOAA Fisheries Service 2009). It occurs in shallow coastal waters within the Gulf and generally in nearshore habitats with muddy and sandy bottoms. This species is often found in sheltered bays, on shallow banks, and in estuaries or river mouths (NOAA Fisheries Service 2011f). In 2009, the NOAA Fisheries Service designated two areas on the southwestern coast of Florida between Charlotte Harbor and Florida Bay as critical habitat: Charlotte Harbor Estuary Unit, which comprises approximately 346 square miles of coastal habitat, and the Ten Thousand Islands/Everglades Unit, which comprises approximately 967 square miles of coastal habitat (Federal Register 2009a).

Gulf Sturgeon – Threatened

Gulf sturgeon spawns in freshwater and forages and overwinters in estuarine and salt water. They return to their natal freshwater source to spawn in areas of rock and rubble in coastal rivers during the summer and occur in the Gulf and its estuaries and bays in the cooler months. Spawning rivers include: the Pearl River in Louisiana/Mississippi, Pascagoula River in Mississippi, Escambia, Yellow, and Choctawhatchee Rivers in Florida and Alabama, the Apalachicola River in Florida, and the Suwannee River in Florida, Common wintering and foraging sites include: The Rigolets in Louisiana, Mississippi barrier islands, Mississippi Sound, Pascagoula Estuary, Pensacola Bay, Santa Rosa Sound, Escambia Bay, Choctawhatchee Bay, Apalachicola Bay, Saint Vincent Sound, Suwanee Sound, and the nearshore Gulf of Mexico (Ross et al. 2009; Fox et al. 2002; Duncan et al. 2011; Parauka et al. 2011; Sulak et al. 2009). Gulf sturgeon are bottom feeders, eating primarily macroinvertebrates, mollusks, worms, and crustaceans (USFWS 1995). Pre-spawning activity is initiated in the spring and they migrate back to the Gulf in the fall. In 2003, the USFWS and NOAA Fisheries Service designated 14 geographic areas among the Gulf rivers and tributaries as critical habitat for the Gulf sturgeon (Figure 3-9) encompassing approximately 1,730 miles and 3,333 square miles of estuarine and marine habitat (Federal Register 2003), respectively. Specific geographic areas that are essential for the conservation of the species and that may require special management and protection have been designated as critical habitat for Gulf sturgeon.

The Primary Constituent Elements (PCEs) of Gulf sturgeon critical habitat are:

1. Abundant food items, such as detritus, aquatic insects, worms, and/or mollusks, within riverine habitats for larval and juvenile life stages; and abundant prey items, such as amphipods, lancelets, polychaetes, gastropods, ghost shrimp, isopods, mollusks and/or crustaceans, within estuarine and marine habitats and substrates for subadult and adult life stages;
2. Riverine spawning sites with substrates suitable for egg deposition and development, such as limestone outcrops and cut limestone banks, bedrock, large gravel or cobble beds, marl, soapstone, or hard clay;
3. Riverine aggregation areas, also referred to as resting, holding, and staging areas, used by adult, subadult, and/or juveniles, generally, but not always, located in holes below normal riverbed depths, believed necessary for minimizing energy expenditures during freshwater residency and possibly for osmoregulatory functions;
4. A flow regime (*i.e.,* the magnitude, frequency, duration, seasonality, and rate-of-change of freshwater discharge over time) necessary for normal behavior, growth, and survival of all life stages in the riverine environment, including migration, breeding site selection, courtship, egg

fertilization, resting, and staging, and for maintaining spawning sites in suitable condition for egg attachment, egg sheltering, resting, and larval staging;

5. Water quality, including temperature, salinity, pH, hardness, turbidity, oxygen content, and other chemical characteristics, necessary for normal behavior, growth, and viability of all life stages;
6. Sediment quality, including texture and other chemical characteristics, necessary for normal behavior, growth, and viability of all life stages; and
7. Safe and unobstructed migratory pathways necessary for passage within and between riverine, estuarine, and marine habitats (*e.g.*, an unobstructed river or a dammed river that still allows for passage).

A.5 Sea Turtles

Additional detailed information on the life cycles, habitat preferences, and migration patterns of each of the five sea turtle species in the Gulf of Mexico is presented below. All five sea turtle species discussed are Federally listed. Table A-2 presents the ESA status for each of the five species as well as information on the use of Gulf of Mexico habitats by each species.

Table A-2. Threatened and Endangered Sea Turtles of the Gulf of Mexico

COMMON NAME	SCIENTIFIC NAME	ENDANGERED SPECIES STATUS	USE OF GULF
Loggerhead sea turtle	*Caretta caretta*	9 DPSs – 4 listed as threatened (Northwest Atlantic Ocean, South Atlantic Ocean, Southwest Indian Ocean, and Southeast Indo-Pacific Ocean DPSs) and 5 listed as endangered (Northeast Atlantic Ocean, Mediterranean Sea, North Pacific Ocean, South Pacific Ocean, and North Indian Ocean DPSs).	From Texas to Florida in shallow water habitats, continental shelf waters, open Gulf waters; nesting on Gulf Coast beaches in Florida, Alabama, Mississippi, and Texas. Records of historical nesting in Louisiana and Mississippi. Critical habitat has been proposed.
Green sea turtle	*Chelonia mydas*	Breeding populations in Florida and on the Pacific Coast of Mexico are listed as Endangered; all others are listed as Threatened.	Inshore and nearshore waters from Texas to Florida; nests in Texas and Florida. Historically reported as nesting in Alabama (see figure 3-10 in chapter 3 for critical habitat).
Hawksbill sea turtle	*Eretmochelys imbricata*	Endangered	From Texas to Florida, particularly near coral reefs, in coastal and open Gulf waters; one record of nesting at Padre Island National Seashore, Texas; records of nesting in Florida (see figure 3-10 in chapter 3 for critical habitat).
Kemp's ridley sea turtle	*Lepidochelys kempii*	Endangered	From Texas to Florida in coastal and pelagic waters; nesting on Gulf Coast beaches in Texas, and infrequently in Alabama and Florida.

Table A-2. Threatened and Endangered Sea Turtles of the Gulf of Mexico

COMMON NAME	SCIENTIFIC NAME	ENDANGERED SPECIES STATUS	USE OF GULF
Leatherback sea turtle	*Dermochelys coriacea*	Endangered	Pelagic and coastal waters of the Gulf of Mexico; nests in Florida and incidentally in Texas (see figure 3-10 in chapter 3 for critical habitat).

Loggerhead Sea Turtle

Loggerhead sea turtles are broken into nine distinct population segments (DPSs) with listings of threatened or endangered under the ESA. The northwest Atlantic Ocean DPS, which includes the Gulf of Mexico, is listed as threatened. Loggerheads are circumglobal, occurring throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans. Loggerheads are the most abundant species of sea turtle found in U.S. coastal waters (NOAA Fisheries Service 2011g).

Loggerhead nesting beaches have been observed n Florida, Alabama, Mississippi, and Texas. Nesting beaches were documented in Mississippi in 2012; historically, there have been infrequent instances of nesting loggerheads on barrier islands in Mississippi. Historical records indicate that nesting also occurred on beaches in Louisiana (FWC 2012a; Share the Beach 2012; Wynne and Schwartz 1999). During non-nesting years, adult females are distributed in waters off the eastern U.S. and throughout the Gulf of Mexico, Bahamas, Greater Antilles, and Yucatán. Nesting typically occurs in the northern Gulf of Mexico between May and August, which hatching occurring through October.

After swimming from land, post-hatchling loggerheads take up residence in areas where surface waters converge to form local downwellings. These areas are often characterized by accumulations of floating material, such as sargassum, and, in the southeast U.S., are common between the Gulf Stream and the southeast U.S. coast, and between the Loop Current and the Gulf Coast of Florida. Post-hatchlings within this habitat are observed to be low-energy, float-and-wait foragers that feed on a wide variety of floating items, developing into juvenile sea turtles (Witherington 2002; NOAA Fisheries Service 2011g).

During this life stage, juvenile loggerheads are epipelagic and spend 75 percent of their time within the top 16.5 feet of the water column. Most of the dives of the turtles are between 6.5 and 16.5 feet with the remaining dives within the top 330 feet of the water column. Occasionally loggerheads dive to a depth greater than 656 feet. In areas that are shallow, such as around oceanic islands or ocean banks or ridges that come close to the surface, loggerheads spend some time on the bottom feeding. Little information is available on the dietary habits of ocean-stage juveniles (NOAA Fisheries Service 2011g).

Oceanic juveniles migrate to nearshore coastal areas after reaching 7 to 12 years of age and continue maturing until adulthood. In addition to providing critically important habitat for juveniles, the neritic zone also provides crucial foraging habitat, inter-nesting habitat, and migratory habitat for adult loggerheads in the western North Atlantic. To a large extent, these habitats overlap with the juvenile stage, the exception being most of the bays, sounds, and estuaries along the Atlantic and Gulf Coasts of the U.S. from Massachusetts to Texas, which are infrequently used by adults.

Adults primarily inhabit continental shelf waters, including areas in the Gulf of Mexico. Many male and female adult loggerheads utilize shallow water habitats with large expanses of open ocean access, such as Florida Bay, for year-round resident foraging areas (NOAA Fisheries Service and USFWS 2008). The predominant foraging areas for western North Atlantic adult loggerheads are found throughout the relatively shallow continental shelf waters of the U.S., Bahamas, Cuba, and the Yucatán Peninsula, Mexico (NOAA Fisheries Service 2011g). Adult loggerheads feed on a wide variety of organisms, including mollusks and benthic crabs (NOAA Fisheries Service and USFWS 2008).

Migration routes from foraging habitats to nesting beaches (and vice versa) for a portion of the population are restricted to the continental shelf, while other routes involve crossing oceanic waters to and from the Bahamas, Cuba, and the Yucatán Peninsula. Seasonal migrations of adult loggerheads along the mid- and southeast U.S. coasts have also been documented (NOAA Fisheries Service 2011g).

Loggerheads face threats on both nesting beaches and in the marine environment. Though prohibited in most jurisdictions, harvest of loggerheads still occurs in many places and is a serious and continuing threat to loggerhead recovery (NOAA Fisheries Service 2011g).

Critical habitat has been proposed for the Northwest Atlantic Ocean DPS loggerhead sea turtle and includes: 36 occupied marine areas that contain one or a combination of nearshore reproductive habitat (off nesting beaches to 1.6 km (1 miles), wintering habitat, breeding habitat, and constricted migratory corridors (78FR43006) and nearly 1,190 km (739 miles) of nesting beaches in North Carolina, South Carolina, Georgia, Florida, Alabama, and Mississippi (78FR18000). Proposed PCE's for Nesting Habitats include: 1) Suitable nesting beach habitat that: (a) has relatively unimpeded nearshore access from the ocean to the beach for nesting females and from the beach to the ocean for both post-nesting females and hatchlings and (b) is located above mean high water to avoid being inundated frequently by high tides. 2) Sand that: (a) allows for suitable nest construction, (b) is suitable for facilitating gas diffusion conducive to embryo development, and (c) is able to develop and maintain temperatures and moisture content conducive to embryo development. 3) Suitable nesting beach habitat with sufficient darkness to ensure that nesting turtles are not deterred from emerging onto the beach and hatchlings and post-nesting females orient to the sea. Proposed PCE's for Nearshore Reproductive Habitat include: 1) Nearshore waters directly off the highest density nesting beaches as identified in 78FR18000; 2) Water sufficiently free of obstructions or artificial lighting to allow transit through the surf zone and outward toward open water; and 3) Waters with minimal manmade structures that could promote predators (i.e., nearshore predator concentration caused by submerged and emergent offshore structures), disrupt wave patterns necessary for orientation, and/or create excessive longshore currents. Proposed PCE's for Foraging Habitat include: 1) Sufficient prey availability and quality, such as benthic invertebrates, including crabs (spider, rock, lady, hermit, blue, and horseshoe), mollusks, echinoderms and sea pens; and 2) Water temperatures to support loggerhead inhabitance, generally above 10^{o}C. No PCEs were identified for Oceanic Habitat in the Northwest Atlantic Ocean DPS.

Green Sea Turtle

The breeding populations of green sea turtles in Florida and along the Pacific Coast of Mexico are listed as endangered under the ESA. Nesting populations of the green sea turtle in Florida are primarily found in east and southeast Florida. All other populations of green sea turtles are listed as threatened under the ESA (NOAA Fisheries Service 2011h). In a 2004 Green Turtle Assessment, the Marine Turtle Specialist

Group (MTSG) of the International Union for Conservation of Nature classified green turtles as endangered globally. Analyses of historic and recent abundance information by the MTSG indicates that extensive population declines have occurred in all major ocean basins over approximately the past 100 to 150 years. The MTSG analyzed population trends at 32 index nesting sites around the world and found a 48 to 65 percent decline in the number of mature females nesting annually over the past 100 to 150 years (NOAA Fisheries Service 2011h). In 2010 and 2011, however, the number of nests has increased on Florida beaches (FWC 2012b).

The green turtle is globally distributed and generally found in tropical and subtropical waters along continental coasts and islands between 30°N and 30°S (NOAA Fisheries Service 2011h). In U.S. Atlantic and Gulf of Mexico waters, green turtles are found in inshore and nearshore waters from Texas to Massachusetts, the U.S. Virgin Islands, and Puerto Rico. Important feeding areas in Florida include the Indian River Lagoon, the Florida Keys, Florida Bay, Homosassa, Crystal River, Cedar Key, and St. Joseph Bay (NOAA Fisheries Service 2011h).

Like all sea turtles, green turtles primarily use three types of habitat (NOAA Fisheries Service 2011h): beaches for nesting, open ocean convergence zones, and coastal areas for feeding.

Green sea turtles nest on high-energy ocean beaches, generally on islands (NOAA Fisheries Service and USFWS 1991). Large nesting populations are found in Tortuguero, Costa Rica; Raine Island, Australia; and Tamaulipas, Mexico. Within the U.S., green sea turtles are known to nest in the Virgin Islands, Puerto Rico, the east coast of Florida, the Gulf Coast of Florida, and Padre Island, Texas (NOAA Fisheries Service and USFWS 1991; NPS 2011a; FWC 2012a). Between one and six nests are documented on Padre Island, Texas, each year (NPS 2011a). There have also been historical records of nesting in Alabama.

While nesting season varies from location to location, in the southeastern U.S., females generally nest in the summer between June and September; peak nesting occurs in June and July. During the nesting season, females nest at approximately 2-week intervals (NOAA Fisheries Service 2011h).

New hatchlings move to the convergence zones in pelagic areas; the turtles are primarily omnivores during this life stage. After reaching a carapace length of 8 to 10 inches, juvenile green turtles move into benthic foraging grounds in nearshore areas. Upon reaching a certain age, green sea turtles switch to herbivory and feed primarily on algae and seagrasses in shallow benthic environments (NOAA Fisheries Service and USFWS 1991). Coral reefs, rocky outcrops, and jetty rocks located near feeding areas are often used as resting locations for this species. Adult green turtles are unique among sea turtles in that they eat only plants. This diet is thought to give them greenish-colored fat, from which they take their name (NOAA Fisheries Service 2011h).

Critical habitat for the green sea turtle has been designated for the waters surrounding Culebra Island, Puerto Rico, and its outlying keys (63 FR 46693) and is not present in the northern Gulf of Mexico.

Hawksbill Sea Turtle

This species is listed as endangered under the ESA. Hawksbill turtles are circumtropical, usually occurring from 30°N to 30° S latitude in the Atlantic, Pacific, and Indian Oceans and associated bodies of water. Hawksbills are widely distributed throughout the Caribbean Sea and western Atlantic Ocean, the Greater and Lesser Antilles, and along the Central American mainland south to Brazil (NOAA Fisheries Service

2011i). The majority of nesting occurs in Mexico and Cuba in the Caribbean. Within the U.S., hawksbills are most common in Puerto Rico and the U.S. Virgin Islands where the most significant nesting occurs on Mona Island and Buck Island, respectively (Diez and van Dam 2006 as cited in NOAA Fisheries Service 2011i). Along the Gulf Coast, hawksbills have been observed to nest in Florida and Texas. There is one record of nesting at Padre Island National Seashore (NPS 2009). In Florida, nesting is rare and restricted to the southeast coast of Florida and the Florida Keys (USFWS 2000; NOAA Fisheries Service 2011i). Research indicates that adult hawksbill turtles are capable of migrating long distances between nesting beaches and foraging areas, which are comparable to migrations of green and loggerhead turtles.

Hawksbill turtles use different habitats at different stages of their life cycle, but are most commonly associated with healthy coral reefs. Post-hatchlings (oceanic stage juveniles) are believed to occupy the pelagic environment, taking shelter in floating algal mats and drift lines of floating debris in the Atlantic. During the pelagic stage, hatchling hawksbill sea turtles have been observed in sargassum off several Gulf States (Coston-Clements et al. 1991; NOAA Fisheries Service 2011i). Hatchling turtles are thought to actively seek out sargassum mats in the open pelagic ocean. Sargassum mats provide hawksbill sea turtles with a variety of prey, including small crabs and snails (Louisiana Department of Wildlife and Fisheries 2010; NOAA Fisheries Service 2011i).

After a few years in the pelagic zone, small juveniles return to coastal foraging grounds. This shift in habitat also involves a shift in feeding strategies, from feeding primarily at the surface to feeding below the surface primarily on animals associated with coral reef environments. Coral reefs are the preferred foraging habitat of juvenile and adult hawksbill sea turtles. They feed primarily on sponges and are thought to be selective in their diet based on the limited species of sponges found in the guts of hawksbill sea turtles (NOAA Fisheries Service and USFWS 1993).

The ledges and caves of coral reefs provide shelter for resting hawksbills both during the day and at night. Hawksbills are known to inhabit the same resting spot at night. Hawksbills are also found around rocky outcrops and high energy shoals, which are also optimum sites for sponge growth. They are also known to inhabit mangrove-fringed bays and estuaries, particularly along the eastern shore of continents where coral reefs are absent (NOAA Fisheries Service 2011i).

Critical habitat for the hawksbill sea turtle has been designated for selected beaches and/or waters of Mona, Monito, Culebrita, and Culebra Islands, Puerto Rico (63 FR 46693) and is not present in the northern Gulf of Mexico.

Kemp's Ridley Sea Turtle

Kemp's ridley sea turtles are listed as endangered under the ESA. Kemp's ridleys are distributed throughout the Gulf of Mexico and U.S. Atlantic seaboard, from Florida to New England, but, due to drastic population declines in the mid nineteen hundreds, only 251 nests were recorded in Texas from 2002-2006. They display one of the most unique synchronized nesting habits in the natural world. Large groups of Kemp's ridleys gather off a particular nesting beach near Rancho Nuevo, Mexico, in Tamaulipas; then, wave upon wave of females come ashore and nest in what is known as an "arribada," which means "arrival" in Spanish. There are many theories on what triggers an arribada, including offshore winds, lunar cycles, and the release of pheromones by females (NOAA Fisheries Service 2011j). Scientists have yet to conclusively determine the cues for ridley arribadas. Arribada nesting is a behavior

found only in the genus *Lepidochelys*. Female Kemp's ridleys nest from late March to July (NOAA Fisheries Service 2011j).

The Kemp's ridley has experienced a historical, dramatic decrease in arribada size. An amateur video from 1947 documented an extraordinary Kemp's ridley arribada near Rancho Nuevo. It has been estimated that approximately 42,000 Kemp's ridleys nested during that single day (Hildebrand 1963; NOAA Fisheries Service 2011j). Twenty years after the video was filmed, the largest arribada measured was just 5,000 individuals. Between the years of 1978 and 1991, only 200 Kemp's ridleys nested annually. Today the Kemp's ridley population appears to be in the early stages of recovery. Nesting has increased steadily over the past decade (NOAA Fisheries Service 2011j). In 2011, 20,570 Kemp's ridley nests were recorded in Tamaulipas, Mexico (Pena 2011). This is slightly less than the 21,144 nests registered during 2009, which was the greatest number of nests recorded since monitoring began in 1978. As of June 2012, nesting numbers are potentially on track to break the 2009 record, although the final number of nests is not currently available (Klemm 2012).

Arribadas occur in Tamaulipas, Mexico and to a lesser extent in Vera Cruz, Mexico and Texas. The three main nesting beaches in Tamaulipas, Mexico, are Rancho Nuevo, Tepehuajes, and Barra del Tordo, where about 85 percent of worldwide Kemp's ridley nesting occurs. In 2010, there was a petition made to designate critical habitat for Kemp's ridley sea turtles for nesting beaches along the Texas coast and marine habitats in the Gulf of Mexico and Atlantic Ocean. This petition is currently under review by USFWS and NOAA Fisheries Service (NOAA Fisheries Service 2011j).

On the Texas coast, 1,111 Kemp's ridley nests were recorded from 2002 to 2011. For the 2011 nesting season, 199 nests have been recorded in Texas, with 117 of those nests documented at Padre Island National Seashore. Those 199 nests are the most recorded for the Texas coast since consistent record keeping began in the early 1980s, passing the 2006 record of 102 nests (Shaver 2012; NOAA Fisheries Service 2011f; NPS 2012a). Texas nesting as of the end of June 2012 has already reached 200 with a month or two left in the nesting season.

Kemp's ridley post-hatchlings are likely transported into the northern Gulf of Mexico and then eastward; some continue southward in the Loop Current, then eastward on the Florida Current into the Gulf Stream, while others may remain within the Gulf of Mexico currents. Kemp's ridleys that remained in the Gulf of Mexico during their early oceanic stage apparently move into coastal waters, mainly along the northern and eastern shorelines of the Gulf. Both the initial transition and the subsequent movements of juvenile Kemp's ridleys to and from these shallow coastal habitats appear to be seasonal. The main characteristics that define the areas inhabited during the juvenile developmental stage are somewhat protected, temperate waters, shallower than 160 feet (NOAA Fisheries Service and USFWS 1992; NOAA Fisheries Service, USFWS, and SEMARNAT 2011). During the pelagic stage, Kemp's ridley turtles have been observed in sargassum off several Gulf States (Coston-Clements et al. 1991).

Adult Kemp's ridleys primarily occupy neritic habitats. Neritic zones typically contain muddy or sandy bottoms where prey can be found. Kemp's ridleys rarely venture into waters deeper than 160 feet (NOAA Fisheries Service 2011j; Byles and Plotkin 1994; Shaver and Rubio 2008). Their diet consists mainly of crabs, but may also include fish, jellyfish, and an array of mollusks (NOAA Fisheries Service 2011j).

No critical habitat has been designated for the Kemp's ridley sea turtle.

Leatherback Sea Turtle

Leatherback sea turtles are listed as endangered under the ESA. Leatherback turtle nesting grounds are located around the world, with the largest remaining nesting assemblages found on the coasts of northern South America and West Africa. The U.S. Caribbean, primarily Puerto Rico and the U.S. Virgin Islands, and southeast Florida and the Gulf Coast of Florida support minor nesting colonies, but represent the most significant nesting activity within the U.S. (NOAA Fisheries Service 2011k; FWC 2012c). Adult leatherbacks are capable of tolerating a wide range of water temperatures, and have been sighted along the entire continental coast of the U.S. as far north as the Gulf of Maine and south to Puerto Rico, the U.S. Virgin Islands, and into the Gulf of Mexico including waters off the Florida panhandle and Alabama.

Leatherback turtles are commonly known as pelagic animals, but they also forage in coastal waters. They are the most migratory and wide ranging of sea turtle species in the Gulf and feed mainly on soft-bodied animals such as jellyfish and salps (free-swimming, barrel-shaped marine invertebrates) (NOAA Fisheries Service 2011k).

Marine and terrestrial critical habitat for the leatherback sea turtle has been designated at Sandy Point on the western end of the island of St. Croix, U.S. Virgin Islands (44 FR 17710) and critical habitat will be reassessed during the future planned status review (76 FR 47133).

A.6 Birds

This section presents additional life history information on selected bird species known to occur along the northern Gulf of Mexico including Federally listed species. Species described in more detail in this section represent species that spend all or a large portion of their annual life cycle along the northern Gulf of Mexico. Some species such as redhead, common loon and northern gannet winter along the Gulf coast; other species have restricted ranges and are not found anywhere else in the United States (e.g., buff-bellied hummingbird and green kingfisher). Descriptions of these and other species are presented in taxonomic order by major groups: waterfowl and other water-dependent species, raptors, colonial nesting species, shorebirds, marsh-dwelling birds, near-passerines and passerines and Federally listed species. Table A-3 presents the Federally listed bird species and species of conservation concern that may be found within along the northern Gulf of Mexico for each of the five Gulf states. Figure 3-16 depicts the bird conservation regions (BCRs) used as a basis for multi-disciplinary bird conservation programs and plans.

Waterfowl and Other Water-Dependent Species

Mottled Duck

Dabbling ducks feed primarily on SAV. Mottled duck (*Anas fulvigula*), a close relative of the mallard (*A. platyrhynchos*), is a mostly non-migratory dabbling species found in open marshy habitat and fresh or brackish ponds adjacent to the coast (Kaufman 1996). The species' range extends from Mexico north along the Gulf of Mexico to Alabama east to peninsular Florida, and most individuals will spend their entire annual cycle within that range. Population densities are highest in fresh and intermediate marshes of southeast Texas and coastal Louisiana (Bielefeld et al. 2010).

***Redhead* (*Aythya americana*) *and Lesser Scaup* (*Aythya affinis*)**

Redhead ducks are habitat specialists in winter and are dependent on shallow coastal habitats dominated by seagrass species: shoal grass (*Halodule wrightii*), manatee grass (*Syringodium filiforme*), and turtle grass (*Thalassia testudinum*) (Woodin and Michot 2002). The large redhead population that winter along the Gulf Coast is found within the Laguna Madre of Texas; winter numbers range from 299,000 to 1,407,000 individuals (GulfBase 2011; Woodin and Michot 2002). Other important Gulf Coast SAV areas include Chandeleur Sound of Louisiana, and Apalachee Bay of Florida (Woodin and Michot 2002). The species shows a strong fidelity to coastal areas within the Gulf of Mexico returning to the same areas each year (Woodin and Michot 2002). Lesser scaup are one of the most abundant and widespread of North American diving ducks and of the wintering population along the Gulf Coast; most winter along the Louisiana (>1.0 million) and Florida (>400,000) Gulf Coasts (Austin et al. 1998). Lesser scaup often are found in the same habitat as redhead, although they forage on mollusks, crustaceans, and other invertebrates rather than SAV (Woodin and Michot 2002; Austin et al. 1998).

***Common Loon* (*Gavia immer*)**

The common loon primarily breeds in Canada (94 percent of the population) and the northern U.S. Seventy percent of the North American common loons migrate to wintering areas along the Atlantic and Gulf Coasts (Evers 2004). They are obligate fish eaters, and commonly occur along inshore waters, but have ranged up to 62 miles offshore across the continental shelf (Evers 2004). Two other species of loons, red-throated and Pacific loon (*G. stellata* and *G. pacifica*), are also found in low numbers during winter months within the Gulf of Mexico.

***Least Grebe* (*Tachybaptus dominicus*)**

In South Texas, the least grebe is non-migratory and dependent on the availability of freshwater marshes, ponds, and lakes with emergent vegetation. In the Rio Grande Valley of southern Texas, the least grebe breeds in resaca (oxbow) lakes, when they are temporarily flooded; nesting (mostly) in areas of retama-huisache woodlands, but also in open water and along edges bordered by reeds (Storer 2011).

***Northern Gannet* (*Morus bassanus*)**

Northern gannet is described in more detail in this appendix because it is considered to be one of the bird species most impacted by the *Deepwater Horizon* oil spill (USFWS 2012a). Northern gannets nest in dense colonies on cliffs and ledges along both sides of the Atlantic. In North America, northern gannet breed in six well-established colonies: three in Quebec, Canada within the Gulf of St. Lawrence, and on islands offshore of Newfoundland, including Bonaventure Island. In winter, northern gannets from four major North American colonies winter in the Gulf of Mexico. Extrapolations from data acquired through bird-borne tracking devices estimated that about 118,600 gannets (66,100 adult and 52,500 immature gannets) are present in the Gulf of Mexico (Montevecchi et al. 2011). Arrival of northern gannet generally begins in November. Northern gannet begin leaving the Gulf of Mexico in February and most adult gannet are gone by mid-April; immature gannets remain longer than adults (Montevecchi et al. 2011). Northern gannets are relatively uncommon inshore along the northern Gulf Coast from Texas to Louisiana and the Gulf Coast of Florida (Clapp et al. 1982). In both habitats, northern gannets feed by plunge-diving for surface schooling fish, squid, and shrimp (Mowbray 2002).

***American White Pelican* (*Pelecanus erythrorhynchos*)**

The American white pelican occurs mainly in western and southern portions of North America, breeding inland within colonies (e.g., remote islands) in large, shallow freshwater bodies. The population east of the Rocky Mountains migrates south after breeding to winter along the Gulf Coast; however, a small non-migratory breeding colony does exist at the Padre Island National Seashore, Texas. The Texas Breeding Bird Atlas notes that since1983 nesting has occurred on an isolated spoil island within the Padre National Seashore boundaries (Texas A&M 2012).

Winter residents are common along the coast and on inland reservoirs in south Texas and the Chenier Plain and Barataria Bay of Louisiana (Texas A&M 2012; National Audubon Society 2011b). In the Grand Bay National Estuarine Research Reserve, Mississippi, concentrations of non-breeding American white pelicans occur during the breeding season (National Audubon Society 2011b). Louisiana (Chenier Plain, Barataria Bay) and Mississippi (Grand Bay) are designated as Important Bird Area (IBAs) (sites that provide essential habitat for one or more bird species) by the National Audubon Society, in part because of the concentration of wintering American white pelicans that occur at these locations (National Audubon Society 2011b).

Preferred winter habitat consists of shallow coastal bays, inlets, and estuaries with forage fish and exposed sites such as sand bars for loafing and roosting. Foraging American white pelicans obtain their food by swimming along the surface, dipping their bills into the water, and scooping up prey (e.g., small fish) in their pouches. In specific, the species utilizes cooperative foraging methods which concentrate / drive schools into the shallow water for easier capture (National Audubon Society 2011a).

Raptors

Bald eagle (Haliaeetus leucocephalus)

Bald eagles are protected by the Bald and Golden Eagle Protection Act. Bald eagles are opportunistic feeders with fish comprising much of their diet. They also eat waterfowl, shorebirds, colonial waterbirds, small mammals, turtles, and carrion (often along roads or at landfills). Because they are visual hunters, eagles typically locate their prey from a conspicuous perch, or soaring flight, then swoop down and strike. The life history of bald eagles can be broadly categorized into nesting and non-nesting periods. During the nesting period, breeding bald eagles occupy and defend "territories." A territory includes the active nest and may include one or more alternate nests that are built or maintained but not used for nesting in a given year. Bald eagles tend to return to the same territory year after year. Bald eagles generally nest near coastlines, rivers, and large lakes where there is an adequate food supply. They nest in mature or old-growth trees, snags (dead trees), cliffs, and rock promontories. Recently, and with increasing frequency, bald eagles are nesting on artificial structures such as power poles and communication towers. In forested areas, bald eagles often select the tallest trees with limbs strong enough to support a nest that can weigh more than 1,000 pounds. Nest sites typically include at least one perch with a clear view of the water, where they forage.

***Osprey* (*Pandion haliaetus*)**

Ospreys are almost exclusively reliant on fish for food and as such are dependent on large open water areas; however, they forage on a wide variety of freshwater and saltwater fish species and as a result are found over a wide range. The species' North American breeding range of the osprey encompasses

northern portions of the U.S. and Canada. In the U.S., summer breeding populations are found from central Alaska south to portions of northern California, Idaho, Wyoming, and Colorado and eastward to New England through portions of Minnesota, Wisconsin, Michigan, and New York. Ospreys also breed southward along the Atlantic Coast to Virginia. From North Carolina south through Florida and along the Gulf Coast to Texas, ospreys are found year-round in the breeding territory. Individuals of the northern breeding population winter along the Gulf of Mexico from Florida through Texas; however, migrants tend to avoid wintering in areas where non-migrant populations breed (Poole et al. 2002). Common denominators for breeding habitat are: an adequate supply of accessible fish within commuting distance (6-12 miles) of the nest; shallow waters (1.5-7 feet deep), which generally provide most accessible fish; and open nest sites free from predators (especially mammalian). Such sites are generally elevated (e.g., trees, large rocks [especially over water], or bluffs), predator-free islands, and, increasingly, artificial structures such as towers supporting electrical lines or cell-phone relays and channel markers. Winter habitat includes coastal rivers, sandy beaches, mangrove creeks, and channels interspersed with mud/salt flats. The availability of fish influences osprey concentrations (Poole et al. 2002).

South Florida's non-migratory osprey population begins egg-laying in late November with a peak in December to mid-January; young fledge about 12-14 weeks later depending on nest location, weather, number of nestlings, etc. In general, the osprey population is thought to be increasing as a result of environmental recovery from pesticides, nesting platforms and other artificial nesting site availability, habituation to human activity, and a broad diet (Poole et al. 2002). Of note, osprey have been identified as a Species of Greatest Conservation Need (SGCN) in Mississippi and is tracked by the Louisiana Department of Wildlife and Fisheries Heritage Program in Louisiana.

***White-tailed Hawk* (*Buteo albicaudus*)**

White-tailed hawks are found in semi-arid to arid, open areas of the Gulf Coast region of southeastern Texas and a few birds have been observed in Louisiana (Farquhar 2009). The largest concentration of breeding adults is currently located in the coastal bend region of Texas and Mexico (Farquhar 2009). White-tailed hawks nest in small numbers across most of the coastal counties from Brazoria, Texas south. Nesting has occurred on north Padre Island and Matagorda Island, and breeding adults generally stay within or near nesting territories year round while young tend to disperse after fledging.

Wading Birds

Reddish Egret (Egretta rufescens)

Reddish egrets are year-round residents with a limited distribution along the coasts of Texas, Louisiana, Alabama, Mississippi, and southern Florida. As such, they are considered as SGCN in those states, and are also listed by USFWS as a Bird of Conservation Concern and on the Gulf Coast Joint Venture Priority List of Landbird, Shorebird, and Waterbird Guilds (Table A-3). They are commonly found in hypersaline flats and lagoons and forage for small fish on shallow coastal flats, ponds, and lagoons throughout their range. Reddish egrets usually nest in mixed species heronries on coastal natural and artificial islands and mangrove keys (Lowther and Paul 2002). One of the only remaining naturally occurring islands in the Lower Laguna Madre, Green Island, Texas is characterized by a Tamaulipan thornscrub plant community, which provides nesting habitat for one of the largest reddish egret colonies (over 1,400 nesting pairs in 2007) in the world and is designated as a globally IBA (sites that provide essential habitat for one or

more species of bird) not only for its concentration of reddish egret but also for its colony of roseate spoonbills (260 breeding pairs) (National Audubon Society 2011a).

***Roseate Spoonbill* (*Platalea ajaja*)**

Roseate spoonbills are limited in distribution to the Gulf Coast and because of their narrow distribution are listed by Louisiana as a Species of Special Concern and by the USFWS as a Bird Species of Conservation Concern. They are found in a variety of marine, brackish, and freshwater habitats including bays, inlets, estuaries, mangroves, marshes, and beaches where they nest primarily on islands (natural, spoil, mangrove keys, barrier islands) or over standing water in trees and shrubs in colonies. Texas and Louisiana have the largest breeding populations and have maintained large colonies, exceeding 450 pairs (Dumas 2000). In Florida, the nesting season occurs from November through June in several locations around Tampa Bay and northeastern and northwestern Florida Bay. Nesting in Louisiana and Texas occurs from April through August. In Texas, roseate spoonbills nest primarily on upper and central sections of coast: around Galveston Bay, Matagorda Bay, San Antonio Bay, and Corpus Christi Bay (Dumas 2000).

Open Water Feeding Colonial Nesting Species

***Brown Pelican* (*Pelecanus occidentalis*)**

During the middle of the twentieth century brown pelican populations suffered dramatic losses (e.g., impaired reproductive success) related to DDT toxicity. Following the utilization ban of this organochlorine pesticide within the U.S., brown pelican populations have increased or stabilized, which resulted in the species removal from the Endangered Species List in 2009 (USFWS 2011c). Nearly half of the southeastern brown pelican population lives along the northern Gulf Coast as year-round residents; however, the population is supplemented by wintering individuals from more northern portions of its range. Along the Gulf Coast, brown pelicans breed mainly on barrier, natural estuarine, or dredge-spoil islands, except in Florida, where mangrove islets are predominantly used (Shields 2002).

Brown pelicans seasonally forage during breeding (in shallow waters within 6 miles of nesting islands) and non-breeding (up to 47 miles from the nearest land) in shallow waters of estuaries and along the continental shelf for small, surface schooling fishes (e.g., menhaden, silversides, and mullet). Following foraging, brown pelicans are known to utilize a variety of habitat types (e.g., sandbars, pilings, jetties, breakwaters, mangrove islets, and offshore rocks for roosting and loafing (Shields 2002). Along the Gulf of Mexico, nests are typically built directly on bare sand or shell, but may also be constructed in dense vegetation composed of herbaceous plants or low shrubs, mangroves, or small trees (Shields 2002). Nesting along the Gulf Coast generally occurs from January to June with a peak between March and June. Due to the species' site-fidelic nature, brown pelicans are faithful to nest colony sites, and stable, undisturbed sites are occupied consistently, often for decades or longer (Shields 2002).

***Laughing Gull* (*Leucophaeus atricilla*)**

Laughing gulls are small, black-hooded gulls that nest in colonies of up to 25,000 pairs (Burger 1996). Burger (1996) noted estimates of breeding pairs in the Gulf States were: Texas 64,595; Louisiana 28,975; Alabama >5,000; and Florida 24,000-48,000; however, the number of colonies varied and included 65 colonies in Texas, 19 in Louisiana, and more than 10 colonies in Alabama. There are also nesting

colonies on the coast and barrier islands of Mississippi including Horn and Ship islands in the Gulf Islands National Seashore (Mississippi Bird Atlas Project 2012).

Along the Gulf, laughing gulls are year-round residents and are found from south Texas, east to Florida (it is the most common breeder in the Tampa Bay region); however, colonies may be very localized (Burger 1996). Laughing gulls nest in a wide range of habitats, including sandy beaches and islands; they nest in natural islands at the base of mangroves, and other low herbaceous vegetation and tall grasses (Burger 1996). Optimal habitat is often in sparse or dense vegetation that provides some protection from inclement weather and predators. Laughing gulls have a varied diet composed of aquatic and terrestrial invertebrates, including earthworms, flying insects and other insects, snails, crabs including eggs and larvae, fish, squid, detritus, garbage, and berries. Lower Tampa Bay has been designated as an IBA by the National Audubon Society, in part because of a population of breeding laughing gulls estimated at over 10,000 breeding pairs in 2001 (National Audubon Society 2011b).

***Brown Noddy* (*Anous stolidus*)**

Noddies are tropical, marine seabirds that show some behavioral and morphological traits similar to gulls (Chardine and Morris 1996). Brown noddies are localized in distribution and breed in the U.S. only on Bush Key in the Dry Tortugas off the southwestern tip of Florida, though they have nested on other keys in the Dry Tortugas in the past (Chardine and Morris 1996). In the non-breeding season, brown noddies are found at sea, and their presence may be influenced by the presence of schools of predatory fish such as tuna that drive schools of forage fish and squid to the surface (Chardine and Morris 1996). The breeding population on Bush Key, Dry Tortugas, Florida, has been monitored since early in the twentieth century and has fluctuated between about 100 and 2,500-3,000 pairs; in 1996 the population numbered 1,000-2,000 breeding pairs (Chardine and Morris 1996). Brown noddies are considered as SGCN in Florida (Table A-3).

***Gull-billed Tern* (*Gelochelidon nilotica*)**

Gull-billed terns have a large worldwide distribution; however, the estimated 3,019 nesting pairs within the U.S. nest in colonies on sandy beaches or on sandy barrier islands in coastal waters, especially near ocean inlets along the Atlantic and Gulf Coasts (Molina et al. 2009). They do occasionally nest inland and in elevated locations such as roofs. On the Gulf Coast they are year-round residents. Characteristic nest sites are most often in small to medium-sized colonies of 5 to 50 nests with other species of terns and, frequently, black skimmer. Substrates vary from bare sandy beaches and dunes above high tide line, either on natural barrier islands or on artificial dredged-material islands, to dense shell bars above the high-tide line (Molina et al. 2009). Nesting sites are used in consecutive years; however, gull-billed terns appear to be less tolerant of disturbance and less faithful to nest sites than other terns (Molina et al. 2009). Unlike most terns, this species has a broad diet and does not plunge-dive or depend on fish; instead, it feeds primarily on insects, crabs, and other prey. It is also known to eat small chicks of shorebirds and least terns, and to pirate fish from other small terns.

Gull-billed terns and are considered Birds of Conservation Concern by the USFWS and are on the Gulf Coast Join Venture Priority List of Landbird, Shorebird, and Waterbird Guilds as well as designated as SGCN in Texas, Louisiana, Mississippi, and Florida (Table A-3).

Least Tern (Sternula antillarum)

The least tern breeding populations have been described as three distinct subspecies based on separate breeding ranges: (1) coastal least tern that breeds along the Atlantic and Gulf Coasts from New England south to Florida and west along the Gulf Coast to south Texas (TPWD n.d.a); (2) interior least tern that nests along rivers in the central United States; and (3) California least tern that occurs from San Francisco Bay to western Mexico (Thompson et al. 1997). The breeding populations of California and interior least tern are listed as endangered under the Federal ESA. The coastal least tern is not Federally listed; however, it is virtually indistinguishable from the interior least tern that winters along the Gulf of Mexico, and recent evidence indicates that coastal least terns from nesting colonies on the Texas Coast may breed inland with interior least terns (TPWD n.d.a).

Coastal least terns may winter along the Gulf Coast, but are primarily found in winter along the Central American coast and the northern coast of South America from Venezuela to northeastern Brazil (TPWD n.d.a; Thompson et al. 1997).

During the winter, least terns use coastal habitats for foraging and roosting. They are found along barrier and mainland beaches; sand, mud, and algal flats; washover passes, salt marshes, and coastal lagoons (USFWS 1990). Least terns as a group feed in a variety of shallow water habitats, plunge-diving for small surface-swimming fish and shrimp. On the Gulf Coast, species such as bay anchovy, Gulf menhaden, mummichog (*Fundulus heteroclitus*), and silversides are common prey species (Thompson et al. 1997).

***Black Skimmer* (*Rynchops niger*)**

Black skimmers are related to terns; however, their bill is uniquely adapted to capturing small fish. A feeding skimmer flies low over the water with its bill open and its lower mandible under the surface of the water. When the mandible touches a fish, the upper bill (maxilla) snaps down to capture it. Black skimmers forage primarily in shallow tidal waters of bays, estuaries, lagoons, rivers, and pools within salt marshes, as well as creeks, and ditches where schools of small fish in calm surface waters are concentrated.

Black skimmers are highly social, nesting in colonies and forming large flocks outside the breeding season. Large, successful colonies usually occupy the same site from year to year, and are almost exclusively found in coastal areas where they nest on barrier beaches, shell banks, spoil islands, and salt marshes along the Atlantic and Gulf Coasts (Gochfeld and Burger 1994). Preferred colony habitat for black skimmer includes open, sandy substrate with some vegetative cover (less than 30 percent) where eggs and chicks are camouflaged, but also includes completely barren beaches. Black skimmers occasionally nest in salt marsh habitat on mats of dead seaweed or vegetation.

Skimmers typically form distinct sub-colonies in the most open areas of tern colonies; skimmers nest with least terns in Florida, with Forster's, least, and/or gull-billed terns, and laughing gulls along the Gulf Coast; however, in Louisiana, black skimmers have been documented in large single species colonies (Gochfeld and Burger 1994). Black skimmers are considered Birds of Conservation Concern by the USFWS and are on the Gulf Coast Joint Venture Priority List of Landbird, Shorebird, and Waterbird Guilds as well as designated as SGCN in Texas, Louisiana, and Mississippi (Table A-3). Gulf Islands, Florida; Sand Island, Mississippi; Sundown Island, Matagorda Bay, Texas; and Chandeleur Islands and Barataria-

Terrebonne, Louisiana are IBAs that have been designated in part because of their populations of black skimmers (National Audubon Society 2011b).

Shorebirds

***Wilson's Plover* (*Charadrius wilsoni*)**

Wilson's plover is a medium-sized plover species associated strictly with coastal areas, and within the Gulf Coast ranges from southern Florida, including the Florida Keys (except the Dry Tortugas), west along the Gulf Coast to northern Mexico. In winter, they range mainly from central Florida and west to Louisiana and Texas (Corbat and Bergstrom 2000).

A coastal survey for Wilson's plovers over 2004-2005 found that a total of 3,336 individuals were nesting in Texas, Louisiana, and Mississippi comprising more than 50 percent of the U.S. breeding population (6,000 individuals) (Zdravkovic 2006). Wilson's plover is on the Gulf Coast Joint Venture Priority List of Landbird, Shorebird, and Waterbird Guilds, is on the Texas SGCN list, and is also listed in the *U.S. Shorebird Conservation Plan* as a species of "High Concern" (Table A-3).

Wilson's plovers are visual feeders capturing crustaceans, particularly fiddler crabs during low tide on intertidal mudflats (Corbat and Bergstrom 2000). Nesting areas for Wilson's plovers include areas of high salinity and sparse vegetation including salt flats, coastal lagoons, sand dunes, newly accreted beach, dry sand beach, overwash areas, and pre-dunes. Studies have documented site fidelity to the same nesting areas in subsequent years of 48-60 percent (Corbat and Bergstrom 2000). During the nonbreeding season, individuals congregate in groups of up to 30 or more, sometimes with other species of small plovers, for roosting and foraging (Corbat and Bergstrom 2000).

American Oystercatcher (Haematopus palliatus)

American oystercatchers are found in winter along the Gulf of Mexico from Texas to the Gulf Coast of Florida, including offshore islands of eastern Louisiana, Mississippi, and Alabama, and are considered the eastern race *Haematopus palliatus* (Schulte et al. 2010). However, their distribution in winter is very localized. The species is found along the Gulf Coast of Florida between Apalachicola Bay on the Panhandle and the Ten Thousand Islands area of the Everglades; numbers drop off substantially west of Apalachicola Bay. Most flocks are concentrated near Cedar Key, Tampa Bay, and Cape Romano; Cedar Key supports one of the highest densities (Schulte et al. 2010). Estimates from aerial and ground surveys conducted from November 2002 to February 2003 were: Texas, 477; Louisiana, 147, Mississippi, 14; Alabama, 49; and Florida, 2,137 (Brown et al. 2005). The species is strictly coastal and occupy areas of sand or shell beaches, dunes, tidal flats, and salt marsh because they feed almost exclusively on shellfish (e.g., bivalves and other mollusks) and other marine invertebrates that inhabit intertidal areas. In sand or mud flats, they often forage along the edge of the receding tide and feed in shellfish beds while mussels or oysters are still submerged (Nol and Humphrey 2012).

A small population of breeding American oystercatchers nests from Texas to the Gulf Coast of Florida. On the Gulf Coast of Florida, American oystercatchers nest from Lee County north to Bay County (Nol and Humphrey 2012). Nests are typically in open areas with little cover and consist of a shallow depression about 8 inches in diameter and 1-2 inches deep scraped out of sandy substrate. In recent years, they have been observed nesting in non-traditional habitats, including dredge spoil islands, and

saltmarsh habitat (Schulte et al. 2010). American oystercatchers typically show strong annual breeding site fidelity (Schulte et al. 2010). American Oystercatcher is listed in the *U.S. Shorebird Conservation Plan* as a species of "High Concern" (Table A-3).

Marsh-Dwelling Birds

***Yellow Rail* (*Coturnicops noveboracensis*)**

Yellow rail breeds from the maritime provinces of Canada through the northern Great Plains and upper Midwest of the U.S. and winters along the northern Gulf Coast in salt marshes (above the high tide line) where it appears to prefer drier portions of cordgrass marshes. The yellow rail is considered a fairly common winter species in *Spartina* marshes, rice fields within Louisiana, and tall-grass pastures along the Texas coast (Cooksey and Weeks 2006). It feeds primarily on snails, other aquatic invertebrates, and seeds picked from the ground or vegetation (Bookhout 1995). The yellow rail is considered as SGCN in four of the five Gulf States (not Texas) (Table A-3).

***Nelson's Sparrow* (*Ammodramus nelsoni*)**

Nelson's sparrow has an unusual breeding distribution that not only includes coastal marshes from southern Hudson Bay and James Bay, Quebec, south to Maine, but also freshwater marsh on the northern Great Plains of Canada and the U.S. (Kaufman 1996). Nelson's sparrows migrate to the Gulf of Mexico and southern Atlantic Coast to winter. Salt marsh habitat used by Nelson's sparrows generally consists of sedges, rushes, cordgrass, salt grass, and other typical plants, although they will use freshwater marshes or fields adjacent to the coast. They feed primarily on insects and other small invertebrates (Kaufman 1996). Nelson's sparrow is listed as SGCN in Louisiana, Mississippi, and Alabama (Table A-3).

***Seaside Sparrow* (*Ammodramus maritimus*)**

Seaside sparrow is a habitat specialist of salt and brackish marshes. Kaufman (1996) noted that "no other song bird in North America is as closely tied to salt marsh as the seaside sparrow." Because of patchy and disjunct habitat, populations are discontinuous and locally distributed. Discontinuity of populations has resulted in the recognition of nine subspecies: two are extinct and of the remaining seven, five occur within the Gulf of Mexico region (Post and Greenlaw 2009). The Cape Sable seaside sparrow (*Ammodramus maritimus mirabilis)* is Federally listed as endangered and is a year-round resident in the Cape Sable area of the Everglades; it is the only subspecies that is found in freshwater marshes instead of salt marshes (Post and Greenlaw 2009). Cape Sable seaside sparrow (*Ammodramus mirabilis mirabilis*) is discussed further in the *Threatened and Endangered Species* section below. Scott's seaside sparrow (*A. m. peninsulae*) and Walkulla seaside sparrow (*A. m. junicolus*) are residents of the Gulf Coast of peninsular Florida, from the panhandle to Tampa Bay. Louisiana seaside sparrow (*A. m. fisheri*) is resident coastally along the Gulf of Mexico from Alabama west to northeast Texas, and *A. m. sennetti* (no common name) is resident coastally in southern Texas, from Aransas Bay to Boca Chica (Post and Greenlaw 2009). Resident populations along portions of the Gulf Coast remain in or near the breeding territory all year; studies have estimated the population of Scott's and Walkulla seaside sparrows on the northwestern Gulf of Mexico to contain 5,000-10,000 birds (Post and Greenlaw 2009). Seaside sparrow and/or a subspecies are listed as SGCN in the five Gulf States (Table A-3).

Optimum habitat for seaside sparrow contains contiguous nesting and feeding sites, although where the species' occur in non-optimal habitat, individuals travel between nest-centered territories and separate feeding areas. Seaside sparrows require nest sites in high and intertidal marsh zones with openings and edges for foraging. Nests are placed above spring tides, and the upper point of nest placement is determined by availability of stable vegetation for nest support and by amount of cover above nest (Post and Greenlaw 2009). Nesting begins in the early spring (February-March) and may regularly extend into August (Post and Greenlaw 2009). Seaside sparrows feed in open stands of grass, shallow pools, near tidal creeks, either on edges or in bordering cordgrass, gleaning seeds, adult insects, spiders, decapods, amphipods, and mollusks from surrounding vegetation and substrates or by probing in mud (Post and Greenlaw 2009).

Near Passerines and Passerines

***Buff-bellied Hummingbird* (*Amazilia yucatanensis*)**
Buff-bellied hummingbird is the only hummingbird that nests regularly in southern Texas; they nest from February to August. Buff-bellied hummingbirds are found in a variety of habitats, e.g., woodland edges, clearings, or brushy areas, where they nest in a small shrubs or deciduous trees such as common hackberry (*Celtis occidentalis*) or Texas ebony (*Ebenopsis ebano*). Favorite nectar plants include Turk's cap and red salvia (*Lilium superbum* and *Salvia coccinea*, respectively) (Kaufman 1996).

***Green Kingfisher* (*Chloroceryle americana*)**
Green kingfishers are found along rivers, streams, and pond edges along the Mexican border where dense vegetation provides low perches over the water. Green kingfishers require open water habitat where they plunge-dive for fish, and sandy banks for excavating nest burrows (Kaufman 1996).

***Altamira Oriole* (*Icterus gularis*) *and Hooded Oriole* (*I. cucullatus*)**
Altamira and hooded orioles are localized residents along the lower coast of Texas. Originally a native species of Mexico, the Altamira oriole has expanded its range north into Texas where it occupies open, native woodlands, riparian woodlands, and woodland edges in the Rio Grande Valley. Hooded oriole is found in open woods in lowlands, and groves of trees (cottonwood [*Hibiscus tiliaceus*], walnut [*Juglans* spp.], and sycamore [*Platanus* spp.]) along streams and canyons; palm trees are preferred. Both orioles feed on insects, fruit, and nectar (Kaufman 1996).

Threatened and Endangered Species

Attwater's Prairie-Chicken* (*Tympanuculus cupido attwateri*) – *Endangered
Attwater's prairie-chicken represents the southernmost subspecies of the greater prairie chicken (*Tympanuchus cupido*), and is endemic to coastal prairies along the northern Gulf of Mexico. Populations of Attwater's prairie-chicken currently occur in the wild at only two locations: the Attwater Prairie Chicken National Wildlife Refuge (Colorado County, Texas) and private ranches in Goliad and Refugio counties, Texas. Approximately 90 birds remained in these populations as of March 2009. A captive breeding program was initiated in 1992 (USFWS 2010b).

Primary factors in the decline of the Attwater's prairie-chicken include genetic isolation as a result of the loss and fragmentation of the coastal prairie habitat from agricultural, industrial and urban development, overgrazing, and the degradation and alteration of grassland habitat by the invasion of

woody species (USFWS 2010b). Other current threats include diseases and parasites in both the wild and captive setting, inability of captive breeding facilities to produce large numbers of captive-reared birds that are capable of survival and reproduction in wild habitats, and poor brood survival in wild populations (USFWS 2010b).

Attwater's prairie chicken habitat consists of well-drained coastal prairie grasslands with a variety of short and tall grasses as well as some shrubs or weeds and a supply of surface water in summer (TPWD 2011b; USFWS 2010b). Attwater's prairie-chickens also feed on cultivated crops such as corn, peanuts, and rice (USFWS 2010b). Male Attwater's prairie-chickens gather in displaying areas of bare ground or short grass called booming grounds or leks to establish individual territories and attract females (TPWD 2011b). Booming grounds vary in size and may be naturally occurring short grass flats or artificially maintained areas such as roads, airport runways, oil well pads, plowed fields, and drainage ditches. In general courtship activity increases in late January and early February, appears to peak in March, and extends to mid-May. Most nests are located in grasslands within 1 mile of a booming ground and females display fidelity to general nesting areas between years (USFWS 2010b). Nest predation is high and about 70 percent of the nests annually may encounter some predation.

No critical habitat has been designated for this species.

Audubon's crested caracara (Polyborus plancus audubonii) – Threatened

Audubon's crested caracara is a resident, diurnal, and non-migratory raptor species that occurs in pensiular and south Florida, the southwestern U.S. (southern Texas, southwestern Arizona) and Cental America. Only the Florida population is listed under the ESA. It commonly occurs in dry or wet prairie areas with scattered cabbage palms and lightly wooded areas. Nesting occurs in Florida between late September and April; however, the peak is January and February. Nests are often in cabbage palms though other species can be used. Caracaras feed on carrion and live prey including invertebrates, fish, snakes, turtles, birds, and mammals. Caracaras were listed as threated due to loss of dry prairie habitat and lack of regulatory mechanisms to prevent the destruction or modification of its habitats. In addition to continued habitat loss, other threats include human-caused mortality (direct killing, incidental capture in traps, road mortality), susceptibility to environmental catastrophes (due to isolated habitats), mass poisonings (because of scavenging habits), and demographic concnerns such as skewed sex ratios, loss of genetic viability. No critical habitat has been designated for this species.

Wood Stork* (*Mycteria americana*) *– Endangered

Federally listed as endangered, the wood stork is a colonially nesting wading bird found year round in freshwater and estuarine wetlands in Florida, Alabama, and Mississippi (USFWS 2010c). Wood storks are also found along the Texas coast in late summer and early fall as a result of post-breeding dispersal possibly from colonies in Mexico and Central America (Texas A&M 2012). Along the Florida Gulf Coast, nesting colonies are concentrated in Central Florida, and many are located within 15-18 miles of the Gulf Coast (USFWS 2010c). Historically, wood stork may have nested in wetlands throughout the southeastern United States; however, loss of wetland habitat and increased water level management has altered foraging and nesting habitat. Human disturbance of nesting colonies and nest predation have also contributed to the listing of the U.S. breeding population of wood stork as endangered in Alabama and Florida (USFWS 1997).

Wood storks use a variety of freshwater and estuarine wetlands for nesting, foraging, and roosting. Nesting habitat requires medium to tall trees in standing water or islands surrounded by relatively large areas of water. The inundation of nesting areas prior to and during nesting deters predators and reduces nest abandonment and subsequent failure. Seasonal variation in rainfall and surface water volumes may cause wood storks to alter where and when habitats are used for nesting, foraging, or roosting. Changes in use may be local or result in a geographic shift for an entire regional population between years (USFWS 1997).

Wood storks feed almost exclusively on fish and are specialized feeders using a groping, tactile method to capture prey. This method requires foraging habitat that provides high prey densities that allow easy capture. Generally, foraging occurs in a variety of shallow-water wetlands (usually 6-12 inches deep) with open canopies and calm water without dense patches of aquatic vegetation (USFWS 1997).

Colonies are generally formed between January and April, and eggs are laid in late March to late May. Chicks generally fledge in late June or early July to mid-August (Coulter et al. 1999). The 2006 nesting totals indicate that the stork population has reached its highest level since it was listed as endangered in 1984 with over 11,000 nesting pairs documented in Florida, Georgia, South Carolina, and North Carolina (USFWS 2007a). No critical habitat has been designated for Wood Stork (USFWS 1997).

Everglade Snail Kite* (*Rostrhamus sociabilis plumbeus*) – *Endangered

Everglade snail kite is a non-migratory, year-round resident in peninsular Florida where it is common in flooded, freshwater marshes with emergent vegetation dominated by sawgrass (*Cladium jamaicense*) and open water areas where it can visually forage (Sykes et al. 1995). It has been Federally listed primarily as a result of the loss and degradation of wetland habitat in central Florida. Manipulation of water levels, drought, and loss of open areas due to vegetation growth as a result of nutrient enrichment and invasive plant species have played a role in the degradation of Everglade snail kite habitat (USFWS 2007b).

Distribution can be localized based on water levels and the abundance of apple snails (*Pomacea paludosa*), its primary food (Sykes et al. 1995). The Florida population and breeding success is strongly correlated to annual and winter season rainfall and water levels during the breeding season. Nesting almost always occurs over water to deter predation (Sykes et al. 1995).

Within Florida, its range comprises six large freshwater systems, some of which are interconnected, and several small, isolated wetlands: (1) Kissimmiee River valley system; (2) St. Johns River system; (3) Lake Okeechobee system; (4) Loxahatchee Slough system; (5) the Florida Everglades; and (6) Big Cypress Natural Preserve (Sykes et al. 1995). Critical habitat for the Everglade snail kite has been designated (USFWS 2007b).

Northern Aplomado Falcon* (*Falco femoralis septentrionalis*) – *Endangered/Experimental Population

Aplomado falcon inhabits desert and high elevation grasslands as well as savannahs in Central and South America as far south as Tierra del Fuego. A subspecies, the northern aplomado falcon, formerly inhabited desert grasslands and coastal prairies in Texas, New Mexico, and southeastern Arizona. The U.S. distribution of northern aplomado falcon has largely been determined by historic records, and its former abundance has been considered “fairly common” based on the collections; however, it appears

to have been extirpated in the U.S. and was listed as endangered under the ESA because of extirpation and threat from pesticide contamination in eastern Mexico (USFWS 1990a). Brush encroachment, agricultural practices, and collecting are mentioned as factors potentially leading to its extirpation. Since 1980, the Peregrine Fund, Inc. has produced aplomado falcons in captivity for release into the wild. More than 1,142 captive-bred falcons have been released in Texas and more than 244 young have been fledged since 1995 (USFWS 2007c). No critical habitat has been designated for northern aplomado falcon (USFWS 1990a).

Where aplomado falcons have been introduced, they use coastal prairies and desert grasslands with scattered yuccas (*Yucca torreyi*, *Y. elata*, *Y. treculeana*) and honey mesquites (*Prosopis glandulosa*). Foraging habitat typically contains scattered trees and shrubs that provide observation platforms for locating prey. In the U.S. and Mexico, recorded prey include horned lark (*Eremophila alpestris*), Brewer's sparrow (*Spizella breweri*), lark bunting (*Calamospiza melanocorys*), lark sparrow (*Chondestes grammacus*), as well as bats, small mammals, and a large variety of insects (Keddy-Hector 2000). In southern Texas it is also known to prey upon fiddler crabs.

Northern aplomado falcons do not construct their own nests, instead using former nests of other hawk species as well as crested caracara and common raven nests, and the availability of nests may be a limiting factor in ideal habitat (USFWS 1990a).

***Mississippi Sandhill Crane* (*Grus canadensis pulla*)**

Six different subspecies have been recognized for the sandhill crane, and three of the subspecies are non-migratory populations including the Mississippi sandhill crane (USFWS 2011d). Mississippi sandhill cranes are distinct from other sandhill cranes based on genetic, morphological, and behavioral characteristics and are listed as endangered under the ESA due to habitat loss from development and draining; habitat alteration from open pine savannah to pine plantations; fire suppression; and poaching. Today Mississippi sandhill cranes are found only on or adjacent to the Mississippi Sandhill Crane National Wildlife Refuge, Jackson County, Mississippi (USFWS 2011d). A captive-breeding program initiated in 1965 has supplemented the original population through 1989. In 2011, the Mississippi sandhill crane population was 110 cranes; during the winter, individuals of the northern migratory population (mostly greater sandhill cranes) join Mississippi sandhill cranes on the refuge (USFWS 1991).

Mississippi sandhill cranes rely on wet, coastal plain open savannah and swamp (wooded depressions) habitat for nesting and feeding. The habitat consists of wiregrass (*Aristida* spp.), scattered long leaf and slash pines (*Pinus palustris* and *P. elliotti*, respectively), and pond cypress (*Taxodium ascendens*). The savannah-swamp habitat provides invertebrates (insects, earthworms, crayfish), amphibians, and small reptiles for food along with plant matter (roots, tubers, nuts, berries and leaves) (USFWS 1991). Winter roost areas include sawgrass and needlerush marshes (USFWS 1991).

In general, sandhill cranes are long-lived and do not reach maturity until 3-4 years of age. Nesting peaks in April on the refuge and there is evidence that nesting success from hatching to independence is about 57 percent. Based on individual territory requirements, the 15,000-acre refuge is expected to be able to support 30-34 nesting pairs.

Critical habitat for Mississippi sandhill crane was designated in August 1977 in Jackson and Harrison counties, Mississippi (42FR39985).

Whooping Crane* (*Grus americana*) – *Endangered/Experimental Population

Whooping cranes are found only in North America. Historically, migratory populations used several routes including important routes from wintering grounds in Louisiana, Texas, and the Rio Grande Delta of Mexico to nesting grounds in the central U.S. and Canada [Canadian Wildlife Service (CWS) and USFWS 2007]. Prior to 1950, Gulf Coast locations included southwestern Louisiana where there was a non-migratory flock as well as wintering whooping cranes; Bay St. Louis, Mississippi; and Mobile Bay, Alabama. Whooping cranes continue to use ancestral breeding areas, migration routes, and wintering grounds. Reasons for listing and factors limiting whooping cranes include: habitat destruction, shooting, and displacement by activities of man. Current threats include limited genetics of the population, loss and degradation of migration stopover habitat, construction of additional powerlines, degradation of coastal ecosystems, and threat of chemical spills in Texas (CWS and USFWS 2007).

Currently only one self-sustaining, natural, wild population of whooping cranes exists. The self-sustaining population nests in the Northwest Territories and adjacent areas of Alberta, Canada, primarily within boundaries of Wood Buffalo National Park. This population winters along the Gulf Coast at Aransas National Wildlife Refuge and adjacent areas (Lewis 1995). In addition to the breeding population at Wood Buffalo National Park, whooping cranes are found in the wild at 3 other locations and in captivity at 13 sites (Whooping Crane Conservation Association [WCCA] 2011). The second population of wild whooping cranes is non-migratory and occurs in central Florida, primarily on the Kissimmee Prairie where they were re-introduced in 1993 (Lewis 1995; CWS and USFWS 2007). A third population of wild whooping cranes is migratory and was reintroduced in 2001. This population migrates from the Necedah National Wildlife Refuge in central Wisconsin to Chassahowitzka National Wildlife Refuge on the Gulf Coast of Florida. As of May 2011, the total wild population was estimated at 414: 279 individuals in the Wood Buffalo National Park population; 20 individuals in the non-migratory Florida population; 10 in the Louisiana non-migratory population; and 105 in the Wisconsin migratory population (WCCA 2011). A fourth non-migratory population has become established in Louisiana as a result of releases at the White Lake Wetland Conservation Area in 2011 and has a total of 10 whooping cranes. A total of 157 whooping cranes are in captivity (WCCA 2011). Similar to wild cranes, threats to the captive flock include disease, accidents, and limited genetic material (CWS and USFWS 2007).

Whooping cranes are daytime migrants that fly south in the fall as singles, pairs, in family groups, or as small flocks and make regular stops to feed and rest. Spring migration by the Wood Buffalo National Park population from the Texas Gulf Coast begins March 25 to April 15, with last birds generally leaving by May 1. Autumn migration normally begins in mid-September from Wood Buffalo National Park, with most birds arriving on the wintering grounds in Texas between late October and mid-November (Lewis 1995).

In migration and on wintering and breeding grounds, the whooping crane uses a variety of habitats, including coastal marshes and estuaries, inland marshes, lakes, ponds, wet meadows and rivers, and agricultural fields. About 22,500 acres of salt flats and adjacent islands comprise the principal wintering grounds of the whooping crane at the 59,000-acre Aransas National Wildlife Refuge, Texas (TPWD 2012b; USFWS 2012a).

Whooping cranes are omnivorous, probing the soil subsurface with their bills and taking foods from the soil surface or vegetation. The winter diet consists predominately of Carolina wolfberry (*Lycium carlinianum*) and animal foods, especially blue crabs, clams (stout razor clam [*Tagelus plebius*], minor jackknife [*Ensis minor*], Gulf wedge clam [*Rangia cuneata*], angelwing clam [*Cyrtopleura costada*], thick lucine [*Phacoides pectinata*], constricted macorna [*Macoma constricta*]), and the plant wolfberry (*Lycium carolinianum*). Most foraging occurs in the brackish bays, marshes, and salt flats on the edge of the mainland and on barrier islands. Critical habitat in the U.S. was designated in 1978 and includes five sites in four states including wintering habitat of Aransas National Wildlife Refuge and vicinity (CWS and USFWS 2007).

Piping Plover* (*Charadrius melodus*) – *Endangered/Threatened

Piping plover are small, stocky, sandy-colored shorebirds whose name derives from its call notes, plaintive bell-like whistles which are often heard before the birds are observed (USACE 2009). The species breeds in three geographic regions of North America: the Atlantic Coast, Northern Great Plains, and the Great Lakes. The Atlantic Coast and Northern Great Plains populations are Federally listed as threatened and the Great Lakes population is listed as endangered (USFWS 2009). Individuals from all three breeding populations winter along the Gulf Coast primarily along the Mississippi, Louisiana, and Texas coasts. Wintering populations on the Gulf Coast include: 71 percent of the Great Lakes population, 88 percent from the prairies of Canada, and 2 percent of the Great Lakes population (USFWS 2009). As a result of the significance of Gulf Coast habitat to the Interior and Atlantic populations, piping plover are listed as threatened along the Gulf Coast of the U.S. Primary reasons for ESA listing of the piping plover include habitat loss and alterations (primarily from development), human disturbance, and inadequate regulatory mechanisms not only on the breeding range but also within the Gulf Coast winter range (USFWS 2009).

Winter census data collected for piping plover in 2006 enumerated a total of 3,355 individuals wintering within the United States. Census numbers along the Gulf Coast found a distribution of: Texas, 2,090; Louisiana, 226; Mississippi, 78; Alabama 29; and 321 individuals along the Gulf Coast of Florida (USFWS 2009).

Wintering piping plovers are found on beaches and bay shorelines; exposed intertidal substrate is the primary foraging habitat. Tidal wrack (organic material deposited on beaches by tidal action such as seaweed, shells, and driftwood) forms the species' primary roosting habitat. Studies have indicated that wintering piping plover concentrations occur on the Upper Coast of Texas at the mouths of rivers, and "washover" passes (low, sparsely vegetated barrier island habitats created and maintained by storm-driven water channels) into major bay systems as well as exposed seagrass beds and oyster reefs, but that plovers seldom used tidal flats adjacent to developed areas (USFWS 2009). Winter surveys observed that 63 percent of tagged piping plovers returned to their wintering site on Dauphin Island, Alabama demonstrating that there is some fidelity to wintering sites (Elliott-Smith and Haig 2004). Food items consumed on the wintering grounds include marine worms (e.g., polychaetes), insects, crustaceans, mollusks, and other small marine animals (Elliott-Smith and Haig 2004).

Critical habitat has been designated for wintering piping plover throughout the northern Gulf of Mexico Region from the Dry Tortugas, Florida, to the southern Texas Coast. Units of designated critical habitat

by state include: Texas 37 units; Louisiana 7 units; Alabama 3 units; Mississippi 12 units; and 31 units along the Gulf Coast of Florida and the Florida Keys (USFWS 2001).

Primary Constituent Elements of critical habitat include: 1) Intertidal flats with sand or mud flats (or both) with no or sparse emergent vegetation. 2) Adjacent unvegetated or sparsely vegetated sand, mud, or algal flats above high tide are also important, especially for roosting piping plovers. Such sites may have debris, detritus, or microtopographic relief (less than 50 cm above substrate surface) offering refuge from high winds and cold weather. 3) Important components of the beach/dune ecosystem include surf-cast algae, sparsely vegetated back beach and salterns, spits, and washover areas. 4) Washover areas are broad, unvegetated zones, with little or no topographic relief, that are formed and maintained by the action of hurricanes, storm surge, or other extreme wave action.

Red knot (Calidris canutus rufa) – Proposed Threatened

The red knot is a medium-sized shorebird about 9 to 11 inches (in) (23 to 28 centimeters) in length with a proportionately small head, small eyes, short neck, and short legs. The range of the red knot during migration extends along the Atlantic and Gulf of Mexico coasts of North, Central, and South America, from the Canadian arctic to the southernmost extent of South America. Breeding occurs within the central Canadian high arctic. Southward migration from arctic breeding areas begins in mid-July, stopping at various locations along the Atlantic slope to feed and rest. Red knots would generally be expected to "stopover" along the Gulf Coast throughout September and October, then continue their fall migration to their wintering grounds. Red knots winter in four distinct coastal areas of the Western Hemisphere: the southeastern United States (mainly Florida and Georgia, with smaller numbers in South Carolina); the Gulf of Mexico coast of Texas; Maranhão in northern Brazil; and Tierra del Fuego (mainly Bahía Lomas in Chile and Bahía San Sebastián and Río Grande in Argentina with smaller numbers northwards along the coast of Patagonia). However, based on recent studies there are likely other wintering locations that are currently undiscovered. Of the red knots remaining in the southeastern United States to overwinter, the largest concentrations are found along the southwestern coast of Florida, but, red knots also winter as far north as the Florida panhandle, Mississippi, Louisiana, and the mid-Atlantic States.

Roseate Tern* (*Sterna dougallii*) *– Threatened/Caribbean Population

The Caribbean population of the roseate tern subspecies (*Sterna dougallii dougallii*) is morphologically and geographically distinct from the North Atlantic population and is the only tropical population of roseate tern. In the U.S., it is found only in Puerto Rico, the Virgin Islands, and southern Florida including the Dry Tortugas (USFWS 2010c). Approximately 261 breeding pairs occur in Florida, where the primary threats are human disturbance and development (USFWS 2010c). Historically, the Dry Tortugas were the main breeding area for roseate tern in Florida; however, nest failures resulting from predation and storm surges likely caused a shift in the breeding colony to the Florida Keys, where 12 breeding areas were identified from the Key West area to Marathon Key. By 2000 and 2005 the entire Florida breeding population was restricted to two sites (e.g., Marathon Government Center, a roof colony, and Pelican Shoal); in 2005 the Pelican Shoal site became uninhabitable after hurricane damage (USFWS 2010c). In cooperation with the NPS, broadcast calls and decoys have been placed on Long Key, Dry Tortugas, to attract roseate terns, and as of 2007 and 2008, 39 and 47 roseate tern pairs, respectively, nested at Long

Key. This method will be continued until it is determined that roseate terns have become permanently established (USFWS 2010c).

Similar to other colonial nesting tern species, roseate terns in Florida typically nest in relatively open areas, with rocky, grassy, coral rubble, or sand substrate often with no cover nearby; in Florida, roof top nests are also used. Adults arrive in the Dry Tortugas in late April and colonies are formed by mid-May; nesting begins in late May to early June (Gochfeld et al. 1998).

Roseate terns forage by plunge-diving over shallow waters or over schools of predatory fish where small fish are close to the surface and are often in association with other species of terns and noddies (Gochfeld et al. 1998).

No critical habitat has been designated for roseate tern (USFWS 2010c).

Red –cockaded Woodpecker (Picoides borealis) - Endangered

The red-cockaded woodpecker (Picoides borealis) is a federally listed endangered species endemic to open, mature and old growth pine ecosystems in the southeastern United States. Currently, there are an estimated 14,068 red-cockaded woodpeckers living in 5,627 known active clusters across eleven states. This is less than 3 percent of estimated abundance at the time of European settlement. Red-cockaded woodpeckers were given federal protection with the passage of the Endangered Species Act in 1973. Despite this protection, all monitored populations (with one exception) declined in size throughout the 1970's and into the 1980's (USFWS 2003).

In the 1990's, in response to intensive management based on a new understanding of population dynamics and new management tools, most populations were stabilized and many showed increases. Many populations remain in decline, and most have small population sizes. Threats to the species include: degradation of nesting and foraging habitats due to fire suppression, lack of cavity trees and potential cavity trees, habitat fragmentation and subsequent isolation of breeding groups, and loss of genetic variation due to small size and isolation of populations (USFWS 2003).

No critical habitat as been designated for the red-cockaded woodpecker (USFWS 2003).

Cape Sable Seaside Sparrow* (*Ammodramus mirabilis mirabilis*) – *Endangered

Cape Sable seaside sparrow is a small, marsh-dwelling bird that although widely distributed over large areas of south Florida, exists as six subpopulations [Comprehensive Everglades Restoration Plan (CERP) 2012]. The species is associated with open marshes and prairies that are primarily dry throughout most of the year. There are four grass communities that are the primary vegetation communities within Cape Sable seaside sparrow habitat: muhly grass prairie, short sawgrass prairie, tall clumped cordgrass prairies, and patchy low cordgrass prairies. The preferred habitat requires periodic fires to reduce encroachment by brush, shrubs, or trees (CERP 2012). The primary threats to the Cape Sable seaside sparrow include vegetation changes, development, hydrologic alteration, and catastrophic storms. Water levels with periods of inundation maintain the required vegetation; however, if inundation occurs during the nesting season, nests may be flooded reducing reproductive success. Because the population has a limited distribution and small population size, it is less resilient to unfavorable conditions and is at higher risk of localized extirpation (CERP 2012). The current populations appear to have declined as a result of wildfires. The most recent population estimate (2009) is 608 individuals; however, 71 percent

of the population was estimated from one subpopulation, and no individuals were detectable in two of the subpopulations (USFWS 2010e).

Critical habitat has been designated for the Cape Sable seaside sparrow and a revision of the designation in 2007 resulted in the designation of 84,865 acres entirely located within Everglades National Park and the Southern Glades Wildlife and Environmental Area, which is managed jointly by the FWC and the South Florida Water Management District (USFWS 2010e).

Florida Scrub Jay (Aphelocoma coerulescens coerulescenscoerulescents) - Threatened

The Flordia scrub jay occurs in peninsular Florida in scatted and often small, isolated patches of scrub habitat. Scrub jays use early successional scrub habitats. Scrub jay numbers have decline in all or portions of 10 existing metapopulations. Observed declines are consistent with previous modeling statistics that projected furture responses to habitat distribution and availability. Threats to the species include: additional loss, fragmentation, and degradation of early successional scrub habitats used by the species, fire suppression, road mortality (due to foraging along roadsides), supplemental food sources encouraging individuals to stay in otherwise marginal or unsuitable areas, other stochastic events like hurricanes and storm surge, and the introduction and spread of exotic plants and animals. No critical habitat has been designated for this species.

Florida Grasshopper Sparrow (Ammodramus savannarum floridanus) - Threatened

The Florida grasshopper sparrow is a ground-dwelling sparrow resident in the south-central prairie region of Florida (FWC 2014). Habitat requirements include large treeless grasslands dominated by bunch grasses, low shrubs, and saw palmetto with insterspersed open areas for foraging. Threats to the Florida grasshopper sparrow include habitat loss and fragmentation, fire suppression and management, and hydrologic management (i.e., flooding of ground nesting areas during nesting season) (USFWS 2009)

Sprague's Pipit (Anthus spragueii) – Candidate

The Sprague's pipit is small passerine endemic to the North American prairie (75 FR 56028). The species generally uses native prairie habitats that have never been plowed. They will use nonnative planted grasslands but are rarely observed in cropland or marginal farmlands planted primarily with grasses. The species breeds in North Dakota, South Dakota, Montana, Minnesota, and into Canada. Sprague's pipit winters in Arizona, Texas, Oklahoma, Arkansas, Mississippi, Louisiana, and into Mexico using densely and sparsely vegetated grassland and pastures, but rarely cropland. Threats to this species include habitat conversion, fragmentation, degradation, and energy development.

Table A-3. Federally-Listed Bird Species and Species of Conservation Concern

COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS	USFWS[a]	GCJV[b]	USSCP[c]	STATE WILDLIFE ACTION PLAN SPECIES OF GREATEST CONSERVATION NEED				
						TX	LA	MS	AL	FL
Fulvous Whistling Duck	*Dendrocygna bicolor*					X	X			
Mottled Duck (inc. Florida)[d]	*Anas fulvigula (fulvigula)*					X	X	X		X
American Black Duck	*Anas rubripes*							X	X	
Northern Pintail	*Anas acuta*					X	X	X		X
Canvasback	*Aythya valisineria*					X	X			
Redhead[d]	*Aythya Americana*					X	X			
Lesser Scaup[d]	*Aythya affinis*					X	X	X		X
Northern Bobwhite	*Colinus virginianus*			X		X	X	X		X
Attwater's Greater Prairie-Chicken[e]	*Tympanuchus cupido attwateri*	E				X	X			
Red-throated Loon	*Gavia stellata*		X							
Common Loon[d]	*Gavia immer*									X
Horned Grebe	*Podiceps auritus*					X				X
Eared Grebe	*Podiceps nigricollis*					X				
Black-capped Petrel	*Pterodroma hasitata*		X							
Audubon's Shearwater	*Puffinis lherminieri*		X							
Band-rumped Storm-Petrel	*Oceanodroma castro*		X							
Wood Stork[e]	*Mycteria americana*	E*		X		X	X	X	X	X
Magnificent Frigatebird	*Fregata magnificens*		X							X
Masked Booby	*Sula dactylatra*									X
Brown Booby	*Sula leucogaster*		X							
Anhinga	*Anhinga anhinga*							X		
American White Pelican[f]	*Pelecanus erythrorhynchos*					X		X		
Brown Pelican[f]	*Pelecanus occidentalis*					X	X	X		X
American Bittern	*Botarus lentiginosus*		X			X	X	X		X
Least Bittern	*Ixobrychus exilis*		X			X		X	X	X
Great White Heron	*Ardea herodias occidentalis*									X
Snowy Egret	*Egretta thula*					X		X		X
Little Blue Heron	*Egretta cearulea*			X		X		X		X
Tricolored Heron	*Egretta tricolor*					X	X	X		X
Reddish Egret[f]	*Egretta rufescens*		X	X		X		X	X	X
Black-crowned Night-Heron	*Nycticorax nycticorax*							X		X
Yellow-crowned Night-Heron	*Nycticorax violacea*					X	X	X		X

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COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS	USFWS[a]	GCJV[b]	USSCP[c]	STATE WILDLIFE ACTION PLAN SPECIES OF GREATEST CONSERVATION NEED				
						TX	LA	MS	AL	FL
White Ibis	*Eudocimus albus*							X		X
Glossy Ibis	*Plegadis falcinellus*						X			X
White-faced Ibis	*Plegadis chihi*					X				
Roseate Spoonbill[f]	*Platalea ajaja*		X				X			X
Osprey[g]	*Pandion haliaetus*						X	X		
Swallow-tailed Kite	*Elanoides forficatus*		X			X	X	X	X	X
White-tailed Kite	*Elanus leucurus*					X				X
Everglade Snail Kite[e]	*Rostrhamus sociabilis plumbeus*	T								X
Mississippi Kite	*Ictinia mississippiensis*					X				X
Bald Eagle	*Haliaeetus leucocephalus*		X			X	X	X		X
Northern Harrier	*Circus cyaneus*					X	X		X	
Harris's Hawk	*Parabuteo unicinctus*		X			X				
Red-shouldered Hawk	*Buteo lineatus*					X				
Broad-winged Hawk	*Buteo platypterus platypterus*									X
Short-tailed Hawk	*Buteo brachyurus*		X							X
Swainson's Hawk	*Buteo swainsoni*		X			X				
White-tailed Hawk[g]	*Buteo albicaudatus*		X			X				
Ferruginous Hawk	*Buteo regalis*					X				
Crested Caracara (Audubon's)[k]	*Polyborus plancus audubonii*	T					X			X
American Kestrel (southeastern)	*Falco sparverius paulus*		X			X	X	X	X	X
Merlin	*Falco columbarius*					X				X
Northern Aplomado Falcon[e]	*Falco femoralis*	E				X				
American Peregrine Falcon	*Falco peregrinus anatum*		X			X	X			
Arctic Peregrine Falcon	*Falco peregrinus tundrius*					X				
Prairie Falcon	*Falco mexicanus*					X				
Yellow Rail[h]	*Coturnicops novaeboracensis*		X				X	X	X	X
Black Rail	*Laterallus jamaicensis*		X	X		X	X	X	X	X
Clapper Rail	*Rallus longirostris*					X	X			X
Mangrove Clapper Rail	*Rallus longirostris insularum*									X
Florida Clapper Rail	*Rallus longirostris scottii*									X
King Rail	*Rallus elegans*			X		X	X	X		X

Table A-3. Federally-Listed Bird Species and Species of Conservation Concern

COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS	USFWS[a]	GCJV[b]	USSCP[c]	STATE WILDLIFE ACTION PLAN SPECIES OF GREATEST CONSERVATION NEED				
						TX	LA	MS	AL	FL
Virginia Rail	*Rallus limicola*					X				
Purple Gallinule	*Porphyrio martinica*					X		X		
Limpkin	*Aramus guarana*		X							X
Mississippi Sandhill Crane[e]	*Grus canadensis pulla*	E**					X	X		
Florida Sandhill Crane	*Grus canadensis pratensis*									X
Whooping Crane[e]	*Grus americana*	E***				X	X			X
American Golden-Plover	*Pluvialis dominica*				X	X				
Snowy Plover	*Charadrius nivosus*		X	X	X	X	X	X	X	
Cuban Snowy Plover	*Charadrius nivosus tenuirostris*									X
Wilson's Plover[i]	*Charadrius wilsonia*		X	X	X	X	X	X	X	X
Piping Plover[e]	*Charadrius melodus*	E/T			X	X	X	X	X	X
Mountain Plover	*Charadrius montanus*		X		X	X				
American Oystercatcher[i]	*Haematopus palliatus*		X		X	X	X	X	X	X
Black-necked Stilt	*Himantopus mexicanus*					X				
American Avocet	*Recurvirostra americana*					X				X
Solitary Sandpiper	*Tringa solitaria*		X			X				
Greater Yellowlegs	*Tringa melanoleuca*					X				
Lesser Yellowlegs	*Tringa flavipes*		X			X				
Upland Sandpiper	*Bartramia longicauda*		X			X				
Whimbrel	*Numenius phaeopus*		X		X	X				X
Long-billed Curlew	*Numenius americanus*		X	X	X	X				
Hudsonian Godwit	*Limosa haemastica*		X	X	X	X				
Marbled Godwit	*Limosa fedoa*		X		X	X	X	X		X
Ruddy Turnstone	*Arenaria interpres*				X	X				
Red Knot	*Calidris canutus rufa*	P	X		X	X	X	X		X
Sanderling	*Calidris alba*				X	X				X
Semi-palmated Sandpiper (Eastern)	*Calidris pusilla*		X							X
Western Sandpiper	*Calidris mauri*			X		X		X		X
White-rumped Sandpiper	*Calidris fusicollis*									X
Pectoral Sandpiper	*Calidris melanotus*									X
Dunlin	*Calidris alpine*						X	X		
Stilt Sandpiper	*Calidris himantopus*			X		X				
Buff-breasted Sandpiper	*Tryngites subruficollis*		X	X	X	X				

Table A-3. Federally-Listed Bird Species and Species of Conservation Concern

COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS	USFWS[a]	GCJV[b]	USSCP[c]	STATE WILDLIFE ACTION PLAN SPECIES OF GREATEST CONSERVATION NEED				
						TX	LA	MS	AL	FL
Short-billed Dowitcher	*Limnodramus griseus*		X	X		X	X			
Wilson's Snipe	*Gallinago delicata*					X				
American Woodcock	*Scolopax minor*				X	X	X	X	X	
Wilson's Phalarope	*Phalarope tricolor*				X	X				
Brown Noddy[f]	*Anous stolidus*									X
Sooty Tern	*Onychoprion fuscata*						X			X
Bridled Tern	*Onychoprion anaethetus*									X
Least Tern[e]	*Sternula antillarum*		X			X	X	X		X
Gull-billed Tern[f]	*Gelochelidon nilotica*		X	X		X	X	X		X
Caspian Tern	*Hydroprogne caspia*						X			X
Black Tern	*Childonias niger*		X							
Roseate Tern[e]	*Sterna dougallii*	T								X
Common Tern	*Sterna hirundo*						X			
Hairy Woodpecker	*Picoides villosus*									X
Red-cockaded Woodpecker[k]	*Picoides borealis*	E					X	X	X	X
Northern Flicker	*Colaptes auratus*									X
Pileated Woodpecker	*Dryocopus pileatus*					X				
Ivory-billed Woodpecker[e]	*Campephilus principalis*	E					X	X	X	X
Northern Beardless-Tyrannulet	*Camptostoma imberbe*		X			X				
Eastern Wood-Pewee	*Contopus virens*					X				
Acadian Flycatcher	*Empidonax virescens*					X				
Great Crested Flycatcher	*Myiarchus crinitis*					X				
Scissor-tailed Flycatcher	*Tyrannus forficatus*					X	X			
Eastern Kingbird	*Tyrannus tyrannus*					X				
Gray Kingbird	*Tyrannus dominicensis*									X
Rose-throated Becard	*Pachyrampus aglaiae*		X			X				
Loggerhead Shrike	*Lanius ludovicianus*		X	X		X	X	X		X
Bell's Vireo	*Vireo bellii*		X			X	X			
Yellow-throated Vireo	*Vireo flavifrons*					X	X			
Warbling Vireo	*Vireo gilvus*					X	X			
Black-whiskered Vireo	*Vireo altiloquus*		X							X
Florida Scrub-Jay[k]	*Aphelocoma coerulescens*	T								X
Common Raven	*Corvus corax*								X	

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COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS	USFWS[a]	GCJV[b]	USSCP[c]	STATE WILDLIFE ACTION PLAN SPECIES OF GREATEST CONSERVATION NEED				
						TX	LA	MS	AL	FL
Horned Lark	*Eremophila alpestris*					X				
Black-crested Titmouse	*Parus atricristatus*					X				
Verdin	*Auriparus flaviceps*		X			X				
White-breasted Nuthatch	*Sitta carolinensis*						X			X
Brown-headed Nuthatch	*Sitta pusilla*		X			X	X	X		X
Cactus Wren	*Campylorhynchus brunneicapillus*		X			X				
Bewick's Wren (*bewickii*)	*Thryomanes bewickii bewickii*		X			X		X	X	
Sedge Wren	*Cistothorus platensis*		X			X	X			
Worthington's Marsh Wren	*Cistothorus palustris griseus*									X
Marian's Marsh Wren	*Cistothrous palustris marianae*									X
Wood Thrush	*Hylocichla mustelina*		X			X	X	X	X	
Brown Thrasher	*Toxostoma rufum*					X				
Long-billed Thrasher	*Toxostoma longirostre*					X				
Curve-billed Thrasher	*Toxostoma curvirostre*		X			X				
Sprague's Pipit	*Anthus spragueii*	C	X			X	X			
Chestnut-collared Longspur	*Calcarius ornatus*		X			X				
Smith's Longspur	*Calcarius picusa*					X	X			
McCown's Longspur	*Calcarius mccownii*					X				
Worm-eating Warbler	*Helmitheros vermivorum*					X	X	X	X	X
Louisiana Waterthrush	*Parkesia motacilla*					X	X	X		X
Bachman's Warbler	*Vermivora bachmanii*	E					X	X		
Golden-winged Warbler	*Vermivora chrysoptera*			X		X				
Blue-winged Warbler	*Vermivora cyanoptera*		X			X				
Prothonotary Warbler	*Protonotaria citrea*		X			X	X	X		X
Swainson's Warbler	*Limnothlypis swainsonii*		X	X		X	X	X	X	X
Kentucky Warbler	*Geothlypis Formosa*		X			X	X	X	X	X
Hooded Warbler	*Setophaga citrina*					X	X			X
American Redstart	*Setophaga ruticilla*					X	X			
Cerulean Warbler	*Setophaga cerulea*		X	X		X	X	X	X	X
Northern Parula	*Setophaga americana*						X			
Tropical Parula	*Setophaga pitiayumi*		X			X				

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COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS	USFWS[a]	GCJV[b]	USSCP[c]	STATE WILDLIFE ACTION PLAN SPECIES OF GREATEST CONSERVATION NEED				
						TX	LA	MS	AL	FL
Yellow Warbler (Cuban subspecies)	*Setophaga petechia gundlachi*		X							X
Yellow-throated Warbler	*Setophaga dominica*					X				
Stoddard's Yellow-throated Warbler	*Setophaga dominica stoddardi*									X
Prairie Warbler	*Setophaga discolor*		X			X	X	X		
Florida Prairie Warbler	*Setophaga discolor paludicola*									X
Black-throated Green Warbler	*Setophaga virens*		X							
White-collared Seedeater	*Sporophila torqueola*		X			X				
Botteri's Sparrow	*Peucaea botterii*		X			X				
Cassin's Sparrow	*Peucaea cassinii*		X			X				
Bachman's Sparrow	*Peucaea aestivalis*		X			X	X	X	X	X
Field Sparrow	*Spizella pusilla*					X	X			
Lark Sparrow	*Chondestes grammacus*					X	X			
Lark Bunting	*Calamospiza melanocorys*		X			X				
Grasshopper Sparrow	*Ammodramus savannarum*		X			X	X	X		X
Florida Grasshopper Sparrow[k]	*Ammodramus savannarum floridanus*	T								X
Henslow's Sparrow	*Ammodramus henslowii*		X			X	X	X	X	
LeConte's Sparrow	*Ammodramus leconteii*		X	X		X	X	X		
Nelson's Sparrow[h]	*Ammodramus nelsoni*		X				X	X	X	
Saltmarsh Sparrow	*Ammodramus caudacutus*		X							
Seaside Sparrow[h]	*Ammodramus maritimus*		X	X		X	X	X	X	
Wakulla Seaside Sparrow[h]	*Ammodramus maritimus junicolus*									X
MacGillivray's Seaside Sparrow[h]	*Ammodramus maritimus macgillivrai*									X
Cape Sable Seaside Sparrow[h]	*Ammodramus maritimus mirabilis*	E								X
Scott's Seaside Sparrow[h]	*Ammodramus maritimus peninsulae*									X
Harris's Sparrow	*Zonotrichia querula*					X				
Summer Tanager	*Piranga rubra*		X							
Scarlet Tanager	*Piranga olivacea*							X		

Table A-3. Federally-Listed Bird Species and Species of Conservation Concern

COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS	USFWS[a]	GCJV[b]	USSCP[c]	STATE WILDLIFE ACTION PLAN SPECIES OF GREATEST CONSERVATION NEED				
						TX	LA	MS	AL	FL
Pyrrhuloxia	*Cardinalis sinuatus*					X				
Varied Bunting	*Passerina versicolor*		X							
Painted Bunting	*Passerina ciris*		X			X	X	X		
Dickcissel	*Spiza americana*		X			X	X			
Eastern Meadowlark	*Sturnella magna*									
Western Meadowlark	*Sturnella neglecta*					X				
Rusty Blackbird	*Euphagus carolinus*		X				X	X		
Orchard Oriole	*Icterus spurius*					X	X			
Hooded Oriole	*Icterus cucullatus*		X			X				
Altamira Oriole[j]	*Icterus gularis*		X			X				
Audubon's Oriole	*Icterus graduacaudua*		X			X				

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COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS	USFWS[a]	GCJV[b]	USSCP[c]	STATE WILDLIFE ACTION PLAN SPECIES OF GREATEST CONSERVATION NEED				
						TX	LA	MS	AL	FL

[a] USFWS Birds of Conservation Concern (USFWS 2008a).
[b] GCJV - Gulf Coast Joint Venture Priority List of Landbird, Shorebird, and Waterbird Guilds (2007).
[c] *U.S. Shorebird Conservation Plan* (USSCP), Gulf Coastal Prairie Working Group (2000).
Species described in sections:
[d] *Waterfowl*.
[e] *Threatened and Endangered Species*.
[f] *Colonial Waterbirds*.
[g] *Raptors*.
[h] *Marsh-dwelling Birds*.
[i] *Shorebirds*.
[j] *Passerines*.
[k] *Terrestrial Species.*
E = Endangered
T = Threatened
*Federally Endangered in Alabama and Florida.
** Federally Endangered in Mississippi.
*** Federally Endangered in Texas. Other whooping crane flocks are experimental nonessential populations and include a non-migrating population in Florida, the recently migrating Wisconsin-Florida flock (Necedah National Wildlife Refuge to Chassahowitzka National Wildlife Refuge or St. Mark's National Wildlife Refuge), and non-migrating individuals in Louisiana (Canada Wildlife Service & U.S. Fish and Wildlife Service 2007; NatureServe 2011c; Whooping Crane Eastern Partnership 2011). Experimental populations are reintroduced populations established outside of the species' current range, but within its historical range. A "nonessential" designation for an experimental population established under section 10(j) of the ESA means that on the basis of the best available information, the experimental population is not essential for the continued existence of the species. Regulatory restrictions are also considerably reduced under a nonessential experimental population designation.
Sources: USFWS = Birds of Conservation Concern 2008; GCJV = Gulf Coast Joint Venture Priority List of Landbird, Shorebird, and Waterbird Guilds (2007); USSCP (Gulf Coastal Prairie Working Group 2000); FWC 2011; Alabama Department of Conservation and Natural Resources 2005; Mississippi Wildlife, Fisheries and Parks 2005; Lester et al. 2005; and TPWD 2005.

A.7 Endangered and Threatened Species of Terrestrial Wildlife

Listed terrestrial wildlife species that can be found in habitats above the high tide line include, but are not limited to, butterflies, snails, turtles, crocodiles, mice, voles, rats, woodrats, rabbits, deer, panthers, and bear.

Gulf Coast Beach Mice (Peromyscus polionotus spp.) – Endangered

There are four subspecies of beach mice (St. Andrew [*Peromyscus polionotus peninsularis*], Choctawhatchee [*P. p. allophrys*], Perdido Key [*P. p. trissyllepsis*], and Alabama beach mouse [*P. p. ammobates*]) endemic to the Gulf Coast that are afforded protection under the ESA. The Choctawhatchee beach mouse (CBM), Perdido Key beach mouse (PKBM), and Alabama beach mouse (ABM) were listed as endangered species in 1985 (50 FR 23872). The St. Andrew beach mouse (SABM) was listed as endangered in 1998 (63 FR 70053).

The ABM lives along the coast of Baldwin County, Alabama; the PKBM lives on Perdido Key in Escambia County, Florida and Baldwin County, Alabama; the CBM lives in Walton and Bay Counties, Florida; and the SABM lives in Bay and Gulf Counties, Florida.

Beach mice are small, white to sand-colored rodents that spend their entire lives in the primary, secondary, and scrub dunes. Beach mice are adapted to digging and living underground and use their complex burrows as a place to rest during the day and between nightly foraging bouts, escape from predators, reproduce, and hold limited food caches. The different subspecies can be distinguished based on differences in their pelage. Beach mice are nocturnal and are the only member of the *Peromyscus* genus that dig extensive burrows within the dune system. Beach mice typically inhabit frontal dunes (*i.e.*, primary and secondary) which are characterized by sea oats and other grasses, beach morning glory, railroad vine, woody goldenrod, and false rosemary (Ivey 1949, Blair 1951, Pournelle and Barrington 1953, Bowen 1968, Holliman 1983, Swilling et al. 1996 and 1998, Lynn 2000, Sneckenberger 2001). Beach mice also utilize tertiary dunes, especially when hurricane or storm events damage primary dunes. Tertiary dunes, when present, occur at the interface between frontal and interior scrub dunes and are characteristically the highest dune ridges (about 11 to greater than 25 feet above mean sea level) in this system. Tertiary dune vegetation is generally dominated by scrub oaks, yaupon holly, sand pine, and other woody vegetation. Interior or scrub dunes are often dominated by scrub oaks and yaupon holly, are further inland from the tertiary dunes and may include east-west ridges of dense sand live oak/sand pine canopy alternating with interdune swales containing seasonally or perennially inundated wetlands. Beach mice occupy scrub dunes on a permanent basis and studies have found no detectable differences in beach mouse body mass, home range size, dispersal, reproduction, survival, food quality, and burrow site availability between scrub and frontal dunes (Swilling et al. 1998, Swilling 2000, Sneckenberger 2001).

Two main types of movement have been identified for small mammals: within home-range activity and long-range dispersal. Such movements are influenced by a suite of factors, such as availability of mates, predation risk, habitat quality, and seasonal fluctuations in food availability, food quality, and nutritional needs. Thus, while beach mice are able and do travel great distances given their size, the travel pathways should have vegetated cover and no large gaps or open areas (Sneckenberger 2001, Novak 1997, Lynn 2000, Swilling et al. 1998, Moyers and Shea 2002, Lynn and Kovatch 2004). Previous

connectivity research suggests critical thresholds exist for species persistence in fragmented landscapes (With and Crist 1995). As fragmentation increases and connectivity is lost, species' ability to move through and between habitats is reduced.

Beach mice are nocturnal and forage for food throughout the dune system. Recently, beach mice have been detected traveling between the dunes and the wrack line for foraging (Lynn et al. 2013). Beach mice feed primarily upon seeds and fruits, and appear to forage based on availability and have shown no preferences for particular seeds or fruits (Moyers 1996). Beach mice also eat small invertebrates, especially during late spring and early summer when seeds are scarce (Ehrhart 1978, Moyers 1996

Beach mouse populations are highly dynamic in abundance and distribution and have not been estimated recently. Peak breeding season for Gulf Coast beach mice is autumn and winter, declining in spring, and falling to low levels in summer (Rave and Holler 1992, Blair 1951). However, pregnant and lactating beach mice have been observed in all seasons (Moyers et al. 1999). Beach mice are believed to be generally monogamous (Smith 1966, Foltz 1981, Lynn 2000). While a majority of individuals appear to pair for life, paired males may sire extra litters with unpaired females. Beach mice along the Gulf Coast of Florida and Alabama generally have a lifespan of about nine months, but may live as long as 20 months (Swilling 2000, Blair 1951, Rave and Holler 1992).

Current population viability analysis (PVAs) and population and habitat viability analysis (PHVA) indicate that beach mice species are at risk of extinction due to activities that exacerbate habitat loss and fragmentation including hurricane impacts to both populations and habitats directly and also indirectly as their impacts interact with other factors, including development of higher elevation (scrub) habitat and predation by cats (Oli et al. 2001, Traylor-Holzer 2004, 2005, 2006)[1]. Predation pressure from natural and non-native predators may result in the extirpation of small, local populations of beach mice. Artificial lighting increases the risk of predation and influences beach mouse foraging patterns and natural movements as it increases their perceived risk of predation. Foraging activities and other natural behaviors are influenced by many factors. Artificial lighting alters behavior patterns causing beach mice to avoid otherwise suitable habitat and decreases the amount of time they are active (Bird et al. 2004).

Critical habitat was designated for ABM, CBM and PKBM at the time of listing; however, critical habitat was revised in 2006 (71 FR 60238) for CBM and PKBM and 2007 (72 FR 4330) for ABM. Critical habitat was also designated for the SABM in 2006 (71 FR 60238). Based on the current knowledge of the life history, biology, and ecology of the subspecies and the requirements of the habitat to sustain the essential life history functions of the subspecies, the PCEs of critical habitat for Gulf Coast beach mice consist of:

[1] Population viability analysis (PVA) is essentially a demographic modeling exercise to predict the likelihood a population will continue to exist over time (Groom and Pascual 1997). The true value in using this analytical approach is not to determine the probability of a species' extinction, but to clarify factors that have the most influence on a species' persistence.

1) A contiguous mosaic of primary, secondary scrub vegetation, and dune structure, with a balanced level of competition and predation and few or no competitive or predaceous nonnative species present, that collectively provide foraging opportunities, cover, and burrow sites;
2) Primary and secondary dunes, generally dominated by sea oats that, despite occasional temporary impacts and reconfiguration from tropical storms and hurricanes, provide abundant food resources, burrow sites, and protection from predators;
3) Scrub dunes, generally dominated by scrub oaks, that provide food resources and burrow sites, and provide elevated refugia during and after intense flooding due to rainfall and/or hurricane induced storm surge;
4) Functional, unobstructed habitat connections that facilitate genetic exchange, dispersal, natural exploratory movements, and recolonization of locally extirpated areas; and
5) A natural light regime within the coastal dune ecosystem, compatible with the nocturnal activity of beach mice, necessary for normal behavior, growth and viability of all life stages.

Key Largo Cotton Mouse* (*Peromyscus gossypinus allapaticol*) – *Threatened

Key Largo cotton mice were listed as a threatened species by the USFWS in 1983. This mouse was once found throughout the upper Florida Keys, but it is now restricted to only the very northernmost part of Key Largo, Florida (USFWS 1999d). The Key Largo cotton mouse is dependent on the tropical hardwood hammock forests found in this area for food and shelter. Key Largo cotton mice are omnivores. Habitat fragmentation due to residential and commercial construction as well as natural events (e.g., hurricanes) have degraded the quality of hardwood hammock forests in the Florida Keys, causing a decline in the Key Largo cotton mouse population (USFWS 1999d).

Florida Salt Marsh Vole* (*Microtus pennsylvanicus dukecampbelli*) – *Endangered

Florida salt marsh voles are currently listed as a Federally endangered species. *M. p. dukecampbelli* is a small (less than 8 inches) rodent that is closely related to the meadow vole (USFWS 2010g). It is known only from one site at Waccasassa Bay on the west coast of Florida, where it appears to exist in low numbers. The salt marsh vole is known to occur only in salt marsh habitat where the vegetation is dominated by salt grass, with smooth cordgrass and glasswort (USFWS 2010g). It is believed to survive high tides and storm flooding by swimming and climbing vegetation. Due to the very restricted range of this subspecies, any natural or human-caused adverse impact could result in its extinction. In addition, a single storm could drive the vole to extinction (USFWS 2010g).

Rice Rat* (*Oryzomys palustris natator*) – *Endangered

Rice rat, often called the silver rice rat, was listed as endangered by the USFWS in 1991. It is found only in wetlands habitats of the lower Florida Keys. The silver rice rat can be distinguished from the marsh rice rat by larger body size and smaller populations (USFWS 1999e). Populations vary across the lower Keys based on availability of suitable habitat. Rice rats utilize three different wetland areas: “(1) low intertidal areas, (2) salt marsh flooded by spring or storm tides, and (3) buttonwood transitional areas that are slightly more elevated and only flooded by storm tides” (Goodyear 1987 as cited in USFWS 1999e). Each of these areas is used for different purposes; intertidal areas are generally used during nocturnal activity for foraging, and low salt marsh areas and buttonwood areas are used for foraging

and nesting with the latter providing more dense cover when needed (USFWS 1999e). Critical habitat was designated for the rice rat in 1993 and includes "areas containing contiguous mangrove swamps, salt marsh flats, and buttonwood transition vegetation. These vegetation types, as well as cattail marshes, contain the primary constituent elements necessary for this species survival" (50 Code of Federal Regulations [CFR] 17.95 as cited in USFWS 1999e) and is restricted to nine of the Lower Florida Keys in Monroe County, Florida.

Silver rice rats are omnivorous and eat both animal and plant material. They often forage along the edge of flooded areas for invertebrates, small crabs, and mangrove vegetation and other plant material. Freshwater sources are critical to the survival of this species because they cannot effectively concentrate urine to meet metabolic needs (Dunson and Lazell 1982, and Goodyear 1987 as cited in USFWS 1999e).

The major threat to this species is from degradation and loss of habitat as a result of urbanization (USFWS 1999e). Residential and commercial construction activities generally result in the loss of wetland habitat and reduction of freshwater resources. Residential expansion also introduces predators such as domestic cats that can threaten local populations.

Key Largo Woodrat* (*Neotoma floridana smalli*) – *Threatened

Key Largo woodrats were first listed as threatened under the Endangered Species Conservation Act of 1969; its status was later changed to endangered by the USFWS in 1983 through an emergency listing action. The Key Largo woodrat historically occurred throughout the forested uplands of Key Largo; however, its current range is limited to the northernmost area of Key Largo, Florida, within the tropical hardwood hammock forests (USFWS 1999f).

Key Largo woodrats rely on natural vegetation in hardwood forests to locate food resources and nest materials. This species is known to build large stick "houses" for resting and breeding. Key Largo woodrats are omnivores and feed primarily on a variety of leaves, seeds, and buds from a diversity of tropical hardwood fruits (USFWS 1999f).

The major threat to Key Largo woodrat habitat is modification caused by increasing commercial and residential construction. These activities generally remove all vegetation and grade the area, leaving no suitable habitat for the woodrat. This decreased range also makes this species more susceptible to genetic isolation and hurricanes (USFWS 1993 as cited in USFWS 1999f).

Lower Keys Marsh Rabbit* (*Sylvilagus palustris hefneri*) – *Endangered

Lower Keys marsh rabbits (*Sylvilagus palustris hefneri*) are a Federally listed endangered species. The Lower Keys marsh rabbit is only found in the Lower Florida Keys. Marsh rabbits are semi-aquatic and good swimmers, and they sometimes hide in water to avoid danger. Preferred habitats of the marsh rabbit are swamps, lake margins, and coastal waterways. The Lower Keys marsh rabbit feeds on bushy seaside tansy (*Borrichia frutescens*), which is common in mid-saltmarsh areas (USFWS n.d.a).

Florida Panther* (*Puma concolor coryi*) – *Endangered

Florida panther were listed as endangered by the USFWS (1967) and represents the only subspecies of puma that still occurs in the eastern U.S. Its historical range covered much of the southeastern U.S.,

including Florida, Louisiana, and Mississippi, but is now confined to one breeding population in south Florida; this area represents about 5 percent of its historic range (USFWS 2008c).

Due to their energetic needs, Florida panthers require large unfragmented habitat to thrive. Panthers preferentially select habitats that make it easy to stalk and capture prey; areas of dense understory vegetation allow panthers to stalk prey and are important for resting and denning cover. Prey for the Florida panther is typically either white-tailed deer or feral hogs (Maehr et al. 1990b, and Dalrymple and Bass 1996 as cited in USFWS 2008c). Other prey can include raccoons, rabbits, and alligators.

Florida panther populations continue to face threats due to habitat degradation and fragmentation. Residential and commercial construction, conversion of forest to agriculture, and road construction are the primary human activities that threaten this species. Panther mortality from vehicle collisions is also a common problem (USFWS 2008c). To enhance efforts to protect this species and allow for population recovery, the Florida National Panther Wildlife Refuge was established in 1989. The refuge consists of over 26,000 acres within the Big Cypress Basin in south Florida (USFWS 2012c).

Louisiana Black Bear* (*Ursus americanus luteolus*) – *Threatened

Louisiana black bear were listed as threatened by the USFWS in 1992. This species is typically distinguished from other black bears by its longer and narrower skull and larger molar teeth (USFWS n.d.b). It is found in east Texas, Louisiana, and Mississippi primarily in bottomland hardwood forests and floodplain forests. In addition, the species requires habitat with dense vegetation to provide cover and undisturbed travel corridors. Critical habitat was designated for Louisiana black bear in 2009; this critical habitat covers approximately 1.2 million acres of forest within the states of Texas, Louisiana, and Mississippi (Federal Register 2009b).

Louisiana black bear are generally active from April to November and hibernate during the winter months. Hibernation takes place in large hollow trees or in shallow ground depressions (TPWD n.d.b). After emerging from hibernation, they eat easy to digest plants and berries. Acorns and other nuts are consumed prior to hibernation in the winter.

Habitat loss remains the principal threat to this species. Bottomland hardwoods are frequently flooded due to reservoir construction and many forests are cleared for conversion to agricultural fields (USFWS n.d.b). Clearing of forests for residential and commercial construction activities has also reduced available black bear habitat.

Key Deer* (*Odocoileus virginianus clavium*) – *Endangered

Key deer were listed as endangered in 1967. It once had a range throughout the Florida Keys, but is now restritcted to Big Pine Key and small surrounding islands (USFWS 1999g). The Key deer is the smallest subspecies of the white-tailed deer; males generally weigh between 55 and 75 pounds (National Wildlife Federation n.d.). Key deer utilize various habitats within the key islands including pine flatwoods, pine rocklands, mangrove swamps, and freshwater wetlands. Pine rocklands are particularly important for this species because these areas provide a permanent source of freshwater (USFWS 1999g). Key deer feed primarily on red mangrove trees; however, they can feed on up to 160 other species of vegetation to meet their nutritional requirements. Some of these include palm berries, grasses, and mulberries.

Although a National Key Deer Refuge was established in 1957 for the protection and recovery of this species, Key deer maintain their endangered listing due to continued loss of habitat. Construction activities within the Florida Keys have degraded essential vegetation and freshwater sources. Other human-related activities have also interfered with deer populations. Fencing by residential owners disrupts migration routes and vehicular traffic is the cause of many Key deer mortalities (USFWS 1999g). Many residents of the islands also illegally feed Key deer, which has altered how they use the remaining habitat and has attracted large numbers of deer to residential areas (USFWS 1999g).

Yellow blotched map turtle (Graptemys flavimaculata) – Threatened

The threatened yellow blotched map turtle can be found in the Mississippi counties of Clarke, Forrest, George, Greene, Jackson, Jones, Perry, Stone, and Wayne (Service 1993a) and only inhabits freshwater rivers and large creeks such as the Pascagoula and Escatawpa rivers.

Ringed map turtle (Graptemys oculifera) – Threatened

The ringed map turtle is restricted to the Pearl River and its tributaries, such as the Bogue Chitto, in Louisiana and Mississippi where it basks on logs in the water and nests in large, high sandbars adjacent to the river. It is found in the Louisiana parishes of St. Tammany and Washington (NatureServe 2011g; Service 2010e; Selman & Qualls 2009).

Alabama red-belly turtle (Pseudemys alabamensis) – Endangered

The Alabama redbelly turtle is located in two counties in Alabama (Baldwin and Mobile) and two counties in Mississippi (Jackson and Harrison) (Service 1990b; NatureServe 2011f). These turtles inhabitat freshwater and brackish streams, rivers, and shallow bays along with fresh, brackish, and saltwater bayous or oxbows (Nelson et al. 2009; Leary et al. 2008). The Alabama red belly turtle has been found to nest in uplands flanking marshes or smaller bayous, patchy forests, and areas with partial shade (Leary et al., 2008). In Alabama, nests were detected at Hurricane Landing on Tensaw River, Gravine Island, the highway 90/98 Causeway, Big Island, Meaher State Park and Little River State Park (Leary et al. 2008; Nelson et al. 2009; NatureServe 2011f). In Mississippi, the turtle has been observed along the Pascagoula River and Back Bay of Biloxi, Mississippi Sandhill Crane National Wildlife Refuge, Grand Bay National Wildlife Refuge and in the Grand Bay Estuarine Research Preserve (Leary et al. 2008).

American Crocodile (Crocodylus acutus) – Threatened

The American crocodile is distributed throughout the Florida counties of Broward, Charlotte, Collier, Indian River, Lee, Martin, Miami-Dade, Monroe, Palm Beach, and St. Lucie (Service 1999c). Critical habitat for the American crocodile was designated in 1976 and finalized and augmented in 1977. Habitat for the crocodile includes mangrove swamps, low-energy mangrove-lined bays, creeks, and inland swamps located in and along Miami-Dade and Monroe counties (42 FR 47840; Service 1999c).

Stock Island tree snail (Orthalicus reses [not incl. nesodryas]) – Threatened

The Stock Island tree snail is only found in the Florida counties of Miami-Dade and Monroe (Service 2009c).

Schaus' swallowtail butterfly (Heraclides aristodemus ponceanus) - Endangered

The Schaus' swallowtail butterfly is only found in the Florida counties of Miami-Dade and Monroe (Service 2008d).

Ocelot (Leopardus pardalis) – Endangered

The ocelot (Leopardus pardalis) is listed as endangered throughout its range in the western hemisphere where it is distributed from southern Texas and southern Arizona through Central and South America into northern Argentina and Uruguay. In the 1982 final rule (47 FR 31670), the Service made a determination that the designation of critical habitat was not prudent because such a designation would not be in the best interests of conservation of the species. Currently the Texas population has fewer than 50 ocelots, found in 2 separated populations in southern Texas, at the northern limit of the species' distribution. As of February 2010, there were fewer than 25 total known individuals in the 2 populations in south Texas, with the possibility that more cats inhabit surrounding ranches.

Gulf Coast jaguarundi (Herpailurus yagouaroundi cacomitli) – Endangered

The Gulf Coast jaguarundi (Puma yagouaroundi cacomitli) is listed throughout its range, which was historically limited to the Lower Rio Grande Valley in southern Texas in the United States and eastern Mexico in the States of Coahuila, Nuevo Leon, Tamaulipas, San Luis Potosi, and Veracruz. The United States contains only a small portion of the Gulf Coast jaguarundi's range and habitat.

Table A-4. Federally Listed Terrestrial Wildlife Species

SPECIES COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS	HABITAT NOTES	GULF COAST STATES ADJACENT COASTAL COUNTY/PARISH RANGE[A]
Crustaceans				
Mollusks				
Stock Island Tree Snail[b]	*Orthalicus rese*	Threatened	Smooth-barked trees within hardwood hammock forests	Monroe County, Florida
Insects				
Schaus Swallowtail Butterfly[b]	*Heraclides aristodemus ponceanus*	Endangered	Dense subtropical dry forests	Monroe County, Florida
Reptiles				
American Crocodile[b]	*Crocodylus acutus*	Threatened	Fresh and salt waters mix coastal wetlands and canals	Charlotte through Monroe Counties, Florida
Ringed Map Turtle[b]	*Graptemys oculifera*	Threatened	Pearl River in areas with strong currents and abundance of structures (e.g., logs)	St. Tammany County, Alabama; Hancock County, Mississippi
Yellow Blotched Map Turtle[b]	*Graptemys flavimaculata*	Threatened	Endemic to the Pascagoula River in areas with moderate currents with logs and sandbars.	Jackson County, Mississippi
Alabama Red Belly Turtle[b]	*Pseudemys alabamensis*	Endangered	Freshwater to moderately brackish shallow streams, river, and bayous	Harrison and Jackson Counties, Mississippi; Mobile and Baldwin Counties, Alabama
Mammals				
Small Mammals				
Alabama Beach Mouse[b]	*Peromyscus polionotus ammobates*	Endangered	Primary, secondary and scrub dunes of the coastal strand community	Baldwin County, Alabama
Perdido Key Beach Mouse[b]	*Peromyscus polionotus trissyllepsis*	Endangered	Scrub habitat on frontal dunes	Baldwin County, Alabama; Escambia County, Florida
Choctawhatchee Beach Mouse[b]	*Peromyscus polionotus allophrys*	Endangered	Primary and secondary dunes	Okaloosa, Walton and Bay Counties, Florida
St. Andrew Beach Mouse[b]	*Peromyscus polionotus peninsularis*	Endangered	Primary and secondary dunes	Bay and Gulf Counties, Florida

Table A-4. Federally Listed Terrestrial Wildlife Species

SPECIES COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS	HABITAT NOTES	GULF COAST STATES ADJACENT COASTAL COUNTY/PARISH RANGE[A]
Key Largo Cotton Mouse[b]	*Peromyscus gossypinus allapaticol*	Threatened	Tropical hardwood hammocks	Monroe County, Florida
Florida Salt Marsh Vole[b]	*Microtus pennsylvanicus dukecampbelli*	Endangered	Salt marsh habitat dominated by salt grass (*Distichlis spicata*), smooth cordgrass (*Spartina alterniflora*), and glasswort (*Salicornia* spp.) vegetation	Levy County, Florida
Rice Rat[b]	*Oryzomys palustris natator*	Endangered	Mangrove swamps, salt marsh flats, and buttonwood vegetation	Monroe County, Florida
Medium Mammals				
Key Largo Woodrat[b]	*Neotoma floridana smalli*	Threatened	Tropical hardwood hammock forests	Monroe County, Florida
Lower Keys Marsh Rabbit[b]	*Sylvilagus palustris hefneri*	Endangered	Swamps, lake margins, and coastal waterways are the preferred habitat	Monroe County, Florida
Large Mammals				
Florida Panther[b]	*Puma concolor coryi*	Threatened	Large unfragmented habitat	Polk through Monroe Counties, Florida
Louisiana Black Bear[b]	*Ursus americanus luteolus*	Threatened	Bottomland hardwood forests and floodplain forests	Calcasieu through St. Tammany Parishes, Louisiana
Key Deer[b]	*Odocoileus virginianus clavium*	Endangered	Pine flatwoods, pine rocklands, mangrove swamps, and freshwater wetlands	Monroe County, Florida
Ocelot	*Leopardus pardalis*	Endangered	Dense thornscrub communities with dense vegetation	Texas
Gulf Coast Jaguarundi	*Herpailurus yagouaroundi cacomitli*	Endangered	Thorny shrublands or woodlands and bunchgrass pastures adjacent to dense brush or woody cover	Texas

[a] Counties where species is known to or is believed to occur.
[b] Federally listed wildlife identified by the USFWS as threatened by the gulf oil spill (USFWS 2010a).

A.8 Human Uses and Socioeconomics

This section presents additional information related to human uses and socioeconomics of the northern Gulf of Mexico including demographics. Tables are used to summarize the statistical data.

In the 2010 Census, the shore-adjacent counties and parishes as a whole were made up of 71 percent of people who identify themselves as white, while people who identify themselves as black make up about 16 percent of the population. More than 3 percent of individuals identified themselves as Asian, 6.4 percent identify themselves as some other race, and 2.4 percent identify as 2 or more races. Less than 1 percent of the population of the shore-adjacent counties and parishes identified themselves as American Indian.

Ethnicity is queried separately from race in the Census, and Hispanic ethnicity is defined as anyone who self-identifies as Hispanic or Latino. In the shore-adjacent counties and parishes, 23 percent of the population identified themselves as Hispanic and this population segment includes people of white and non-white races. Table A-5 summarizes race and ethnicity data by county in the shore-adjacent counties and parishes.

Data on other social variables that describe communities (i.e., income, employment, poverty, education, language spoken at home, birthplace, etc.) are collected in the American Community Survey (ACS), which has replaced the Census long form. The ACS is an ongoing survey that provides data every year, but unlike the U.S. Census, the data provided by the ACS are estimates. ACS data are published as 1-year, 3-year, and 5-year estimates. One-year estimates are the most current, but are only available for geographies with a population greater than 65,000; 3-year estimates are available for areas with a population greater than 20,000; and 5-year estimates are the least current, but are available for all geographies. Half of the counties in the shore-adjacent counties and parishes have fewer than 65,000 people, and 15 counties have a population of less than 20,000; therefore, 5-year ACS estimates (2005-2009) were queried for the summaries provided here (Table A-6).

The unemployment rate was calculated based on the civilian labor force. The civilian labor force is made up of individuals aged 16 to 64 that are in the labor force, but not in the armed services. The unemployment rate for the shore-adjacent counties and parishes as a whole was 7.4 percent, and the unemployment rate for individual Gulf states ranges from 6.9 to 9.4 percent. Median household income in the shore-adjacent counties and parishes ranges from $22,747 (Willacy County, Texas) to $62,570 (Brazoria County, Texas). Per capita income ranges from $10,242 (Willacy County, Texas) to $36,942 (Collier County, Florida).

Poverty status is determined through a combination of family income over the past 12 months, and family size. Poverty status is not determined for institutionalized people, people living in military group quarters, people in college dorms, and unrelated individuals under 15 years old. In general, across the shore-adjacent counties and parishes, poverty is highest in the Texas shore-adjacent counties and lowest in the Florida shore-adjacent counties.

Educational attainment data are collected for the population aged 25 years and older. Table A-7 presents shore-adjacent counties and parishes and statewide information on the proportion of the

population over 25 years that has earned a high school diploma, a bachelor's degree, and an advanced degree.

ACS also collects data on languages spoken at home by the population aged 5 and older. Table A-8 presents shore-adjacent counties and parishes and statewide information on languages spoken at home and birthplace.

Table A-5. Summary of Race and Ethnicity Data

GEOGRAPHIC AREA	RACE							ETHNICITY
	% WHITE	% BLACK	% AMERICAN INDIAN	% ASIAN	% PACIFIC ISLANDER	% OTHER RACE	% TWO OR MORE RACES	% HISPANIC (WHITE & NON-WHITE)
Aransas County, TX	87.4%	1.3%	0.7%	2.0%	0.0%	6.3%	2.3%	24.6%
Brazoria County, TX	70.1%	12.1%	0.6%	5.5%	0.0%	9.2%	2.6%	27.7%
Calhoun County, TX	81.5%	2.6%	0.5%	4.4%	0.0%	8.8%	2.1%	46.4%
Cameron County, TX	87.0%	0.5%	0.4%	0.7%	0.0%	9.8%	1.5%	88.1%
Chambers County, TX	78.6%	8.2%	0.6%	1.0%	0.1%	9.5%	2.1%	18.9%
Galveston County, TX	72.5%	13.8%	0.6%	3.0%	0.1%	7.4%	2.7%	22.4%
Harris County, TX	56.6%	18.9%	0.7%	6.2%	0.1%	14.3%	3.2%	40.8%
Jackson County, TX	81.3%	7.0%	0.4%	0.4%	0.0%	8.8%	2.1%	29.0%
Jefferson County, TX	52.2%	33.8%	0.5%	3.4%	0.0%	8.1%	2.0%	17.0%
Kenedy County, TX	87.5%	1.2%	1.4%	0.2%	0.0%	6.7%	2.9%	76.7%
Kleberg County, TX	79.9%	3.7%	0.6%	2.3%	0.1%	10.9%	2.4%	70.2%
Liberty County, TX	77.2%	10.8%	0.6%	0.5%	0.0%	9.0%	2.0%	18.0%
Matagorda County, TX	71.2%	11.4%	0.7%	2.0%	0.0%	12.3%	2.3%	38.3%
Nueces County, TX	81.5%	4.0%	0.6%	1.7%	0.1%	9.6%	2.4%	60.6%
Orange County, TX	86.1%	8.5%	0.5%	1.0%	0.1%	2.1%	1.7%	5.8%
Refugio County, TX	80.5%	6.5%	0.6%	0.4%	0.0%	10.0%	2.0%	47.2%
San Patricio County, TX	85.9%	1.7%	0.6%	0.8%	0.1%	8.5%	2.4%	54.4%
Victoria County, TX	79.5%	6.4%	0.6%	1.0%	0.0%	10.1%	2.4%	43.9%
Willacy County, TX	85.8%	2.1%	0.3%	0.6%	0.0%	9.3%	1.8%	87.2%
Texas Shore-adjacent Counties Total	63.2%	15.9%	0.6%	4.9%	0.1%	12.4%	2.9%	42.1%
State of Texas	70.4%	11.8%	0.7%	3.8%	0.1%	10.5%	2.7%	37.6%
Ascension Parish, LA	73.3%	22.2%	0.3%	0.9%	0.0%	1.9%	1.2%	4.7%
Assumption Parish, LA	66.8%	30.5%	0.6%	0.2%	0.0%	1.0%	0.9%	2.1%
Calcasieu Parish, LA	70.8%	24.8%	0.5%	1.1%	0.0%	0.9%	1.9%	2.6%
Cameron Parish, LA	95.7%	1.7%	0.5%	0.1%	0.0%	0.8%	1.1%	2.3%
Iberia Parish, LA	62.2%	32.0%	0.4%	2.4%	0.0%	1.5%	1.6%	3.1%
Jefferson Parish, LA	62.9%	26.3%	0.5%	3.9%	0.0%	4.3%	2.1%	12.4%
Lafourche Parish, LA	79.4%	13.2%	2.8%	0.7%	0.0%	2.0%	1.8%	3.8%
Livingston Parish, LA	91.9%	5.1%	0.4%	0.5%	0.0%	1.0%	1.1%	3.0%
Orleans Parish, LA	33.0%	60.2%	0.3%	2.9%	0.0%	1.9%	1.7%	5.2%
Plaquemines Parish, LA	70.5%	20.5%	1.6%	3.2%	0.1%	1.4%	2.7%	4.6%
St. Bernard Parish, LA	74.0%	17.7%	0.7%	1.9%	0.1%	2.7%	2.9%	9.2%
St. Charles Parish, LA	69.2%	26.6%	0.3%	0.8%	0.0%	1.3%	1.6%	5.0%

Table A-5. Summary of Race and Ethnicity Data

GEOGRAPHIC AREA	RACE							ETHNICITY
	% WHITE	% BLACK	% AMERICAN INDIAN	% ASIAN	% PACIFIC ISLANDER	% OTHER RACE	% TWO OR MORE RACES	% HISPANIC (WHITE & NON-WHITE)
St. James Parish, LA	48.0%	50.6%	0.2%	0.1%	0.0%	0.4%	0.7%	1.2%
St. John the Baptist Parish, LA	42.5%	53.5%	0.3%	0.7%	0.0%	1.5%	1.4%	4.7%
St. Martin Parish, LA	65.8%	30.7%	0.4%	0.8%	0.0%	0.9%	1.4%	2.1%
St. Mary Parish, LA	59.3%	32.5%	1.8%	1.7%	0.1%	2.6%	2.0%	5.3%
St. Tammany Parish, LA	83.6%	11.4%	0.5%	1.3%	0.0%	1.4%	1.8%	4.7%
Tangipahoa Parish, LA	66.2%	30.3%	0.3%	0.6%	0.0%	1.2%	1.4%	3.5%
Terrebonne Parish, LA	70.3%	18.9%	5.7%	1.0%	0.1%	2.0%	2.1%	4.0%
Vermilion Parish, LA	80.9%	14.3%	0.4%	2.0%	0.0%	1.0%	1.4%	2.4%
Louisiana Shore-adjacent Parishes Total	65.0%	28.4%	0.8%	1.9%	0.0%	2.1%	1.8%	5.7%
State of Louisiana	62.6%	32.0%	0.7%	1.5%	0.0%	1.5%	1.6%	4.2%
Hancock County, MS	88.4%	7.1%	0.5%	1.0%	0.0%	0.8%	2.1%	3.3%
Harrison County, MS	69.7%	22.1%	0.5%	2.8%	0.1%	2.1%	2.7%	5.3%
Jackson County, MS	72.1%	21.5%	0.4%	2.2%	0.1%	1.9%	1.9%	4.6%
Mississippi Shore-adjacent Counties Total	72.8%	20.1%	0.4%	2.4%	0.1%	1.9%	2.3%	4.8%
State of Mississippi	59.1%	37.0%	0.5%	0.9%	0.0%	1.3%	1.1%	2.7%
Baldwin County, AL	85.7%	9.4%	0.7%	0.7%	0.0%	2.0%	1.5%	4.4%
Mobile County, AL	60.2%	34.6%	0.9%	1.8%	0.0%	0.9%	1.5%	2.4%
Alabama Shore-adjacent Counties Total	68.0%	26.9%	0.8%	1.5%	0.0%	1.3%	1.5%	3.0%
State of Alabama	68.5%	26.2%	0.6%	1.1%	0.1%	2.0%	1.5%	3.9%
Bay County, FL	82.2%	10.8%	0.7%	2.0%	0.1%	1.2%	3.1%	4.8%
Calhoun County, FL	80.8%	13.8%	1.1%	0.5%	0.1%	1.4%	2.4%	5.2%
Charlotte County, FL	90.0%	5.7%	0.3%	1.2%	0.0%	1.1%	1.7%	5.8%
Citrus County, FL	93.0%	2.8%	0.3%	1.4%	0.0%	0.8%	1.6%	4.7%
Collier County, FL	83.9%	6.6%	0.3%	1.1%	0.0%	6.2%	1.9%	25.9%
DeSoto County, FL	66.2%	12.7%	0.4%	0.5%	0.0%	17.7%	2.4%	29.9%
Dixie County, FL	88.8%	8.4%	0.4%	0.3%	0.0%	0.5%	1.5%	3.1%
Escambia County, FL	68.9%	22.9%	0.9%	2.7%	0.1%	1.3%	3.2%	4.7%
Franklin County, FL	82.6%	13.8%	0.5%	0.2%	0.1%	1.2%	1.7%	4.6%
Gadsden County, FL	35.9%	56.0%	0.3%	0.5%	0.0%	5.9%	1.3%	9.5%
Gilchrist County, FL	90.9%	5.3%	0.5%	0.4%	0.1%	1.4%	1.5%	5.0%
Glades County, FL	71.0%	12.3%	4.6%	0.4%	0.0%	9.9%	1.7%	21.1%
Gulf County, FL	78.1%	18.7%	0.4%	0.3%	0.0%	0.8%	1.8%	4.3%
Hardee County, FL	72.2%	7.0%	0.6%	1.1%	0.0%	17.1%	2.0%	42.9%

Table A-5. Summary of Race and Ethnicity Data

GEOGRAPHIC AREA	RACE							ETHNICITY
	% WHITE	% BLACK	% AMERICAN INDIAN	% ASIAN	% PACIFIC ISLANDER	% OTHER RACE	% TWO OR MORE RACES	% HISPANIC (WHITE & NON-WHITE)
Hernando County, FL	89.5%	5.1%	0.4%	1.1%	0.0%	1.9%	2.0%	10.3%
Hillsborough County, FL	71.3%	16.7%	0.4%	3.4%	0.1%	5.0%	3.1%	24.9%
Holmes County, FL	90.5%	5.8%	0.8%	0.4%	0.1%	0.4%	2.0%	2.2%
Jackson County, FL	69.1%	26.6%	0.7%	0.5%	0.1%	1.2%	1.9%	4.3%
Jefferson County, FL	60.4%	36.2%	0.3%	0.4%	0.0%	1.5%	1.3%	3.7%
Lafayette County, FL	77.4%	15.9%	0.4%	0.1%	0.0%	4.7%	1.4%	12.1%
Lee County, FL	83.0%	8.3%	0.4%	1.4%	0.1%	4.9%	2.1%	18.3%
Leon County, FL	63.0%	30.3%	0.3%	2.9%	0.1%	1.2%	2.2%	5.6%
Levy County, FL	85.5%	9.4%	0.4%	0.6%	0.1%	2.2%	1.9%	7.5%
Liberty County, FL	77.3%	17.9%	1.1%	0.2%	0.0%	1.9%	1.7%	6.2%
Madison County, FL	57.6%	38.8%	0.5%	0.2%	0.0%	1.6%	1.3%	4.7%
Manatee County, FL	81.9%	8.7%	0.3%	1.6%	0.1%	5.3%	2.0%	14.9%
Marion County, FL	81.0%	12.3%	0.4%	1.3%	0.0%	2.9%	2.1%	10.9%
Monroe County, FL	89.5%	5.7%	0.4%	1.1%	0.1%	1.4%	1.8%	20.6%
Okaloosa County, FL	81.1%	9.3%	0.6%	2.9%	0.2%	2.0%	3.9%	6.8%
Pasco County, FL	88.2%	4.5%	0.4%	2.1%	0.1%	2.6%	2.2%	11.7%
Pinellas County, FL	82.1%	10.3%	0.3%	3.0%	0.1%	2.0%	2.2%	8.0%
Polk County, FL	75.2%	14.8%	0.4%	1.6%	0.1%	5.5%	2.4%	17.7%
Santa Rosa County, FL	87.8%	5.4%	0.9%	1.8%	0.1%	1.0%	3.0%	4.3%
Sarasota County, FL	90.2%	4.7%	0.2%	1.3%	0.0%	2.0%	1.6%	7.9%
Sumter County, FL	86.6%	9.7%	0.4%	0.7%	0.0%	1.5%	1.1%	6.0%
Suwannee County, FL	82.5%	11.4%	0.5%	0.5%	0.0%	3.1%	1.9%	8.7%
Taylor County, FL	75.2%	20.7%	0.8%	0.7%	0.0%	0.9%	1.7%	3.4%
Wakulla County, FL	82.0%	14.5%	0.6%	0.6%	0.1%	0.5%	1.8%	3.3%
Walton County, FL	87.8%	5.8%	0.9%	0.9%	0.1%	2.1%	2.4%	5.3%
Washington County, FL	80.4%	15.0%	1.3%	0.5%	0.1%	0.6%	2.1%	2.9%
Florida Shore-adjacent Counties Total	79.6%	12.1%	0.4%	2.1%	0.1%	3.4%	2.4%	13.6%
State of Florida	75.0%	16.0%	0.4%	2.4%	0.1%	3.6%	2.5%	22.5%
Shore-adjacent Counties and Parishes Total	71.1%	16.3%	0.6%	3.1%	0.1%	6.4%	2.4%	22.5%
Data Source: U.S. Census 2010. Data are current as of October 2012.								

Table A-6. Summary of 5-Year Estimates (2005-2009) of Labor Force, Employment, Income and Poverty Data

GEOGRAPHIC AREA	CIVILIAN LABOR FORCE[A]	% UNEMPLOYED	MEDIAN HOUSEHOLD INCOME	PER CAPITA INCOME	POPULATION FOR WHOM POVERTY WAS DETERMINED		
					% IN POVERTY	% UNDER 5 IN POVERTY	% UNDER 18 IN POVERTY
Aransas County, TX	9,561	8.5%	$41,172	$24,950	17.1%	32.4%	27.2%
Brazoria County, TX	138,524	5.5%	$62,570	$27,208	10.6%	17.1%	14.4%
Calhoun County, TX	9,014	7.0%	$43,305	$20,468	13.9%	17.1%	18.0%
Cameron County, TX	137,948	7.5%	$30,034	$13,474	35.7%	50.1%	47.0%
Chambers County, TX	14,371	4.9%	$60,451	$27,166	11.0%	19.5%	13.5%
Galveston County, TX	138,279	6.9%	$54,398	$27,768	13.0%	18.3%	17.4%
Harris County, TX	1,942,927	7.2%	$50,569	$26,498	16.7%	27.0%	24.4%
Jackson County, TX	6,579	6.6%	$48,509	$23,563	10.0%	8.2%	16.9%
Jefferson County, TX	105,633	8.1%	$41,420	$21,670	18.0%	30.1%	27.0%
Kenedy County, TX	134	22.4%	$25,417	$12,892	52.4%	0.0%	58.1%
Kleberg County, TX	13,371	9.2%	$34,652	$17,941	26.1%	38.2%	25.8%
Liberty County, TX	30,612	8.1%	$44,730	$18,571	15.8%	27.0%	23.1%
Matagorda County, TX	16,687	10.0%	$40,307	$21,396	21.9%	31.6%	31.9%
Nueces County, TX	147,026	7.6%	$42,356	$21,979	19.7%	34.6%	28.2%
Orange County, TX	36,138	7.8%	$45,608	$22,826	14.9%	22.2%	20.1%
Refugio County, TX	2,599	6.3%	$39,914	$17,894	14.5%	24.1%	20.3%
San Patricio County, TX	28,542	7.0%	$43,748	$20,196	14.8%	29.7%	20.5%
Victoria County, TX	41,628	6.9%	$45,859	$23,219	15.2%	27.6%	23.1%
Willacy County, Texas	5,374	6.4%	$22,747	$10,242	46.9%	58.7%	58.2%
Texas Shore - adjacent Counties Total	2,824,947	7.2%	$43,040	$24,864	17.8%	28.7%	25.7%
State of Texas	11,259,841	6.9%	$48,199	$24,318	16.8%	27.4%	23.7%
Ascenion Parish, LA	49,344	4.7%	$60,874	$26,385	10.6%	19.2%	15.2%
Assumption Parish, LA	9,933	7.6%	$43,003	$21,150	19.9%	37.3%	28.4%
Calcasieu Parish, LA	87,013	7.9%	$42,938	$23,514	16.5%	27.2%	23.4%
Cameron Parish, LA	3,913	0.8%	$57,786	$25,681	8.1%	2.3%	15.0%
Iberia Parish, LA	32,541	7.2%	$40,803	$19,559	20.6%	33.0%	29.2%
Jefferson Parish, LA	215,315	7.0%	$48,213	$25,196	13.8%	24.0%	21.5%
Lafourche Parish, LA	41,450	4.0%	$46,196	$22,578	15.4%	29.7%	22.8%
Livingston Parish, LA	55,074	4.2%	$52,779	$22,722	12.0%	17.6%	16.8%
Orleans Parish, LA	156,735	12.8%	$36,258	$23,559	23.4%	38.9%	38.1%
Plaquemines Parish, LA	9,212	6.3%	$50,610	$21,960	10.6%	17.2%	12.7%

Table A-6. Summary of 5-Year Estimates (2005-2009) of Labor Force, Employment, Income and Poverty Data

GEOGRAPHIC AREA	CIVILIAN LABOR FORCE[A]	% UNEMPLOYED	MEDIAN HOUSEHOLD INCOME	PER CAPITA INCOME	POPULATION FOR WHOM POVERTY WAS DETERMINED		
					% IN POVERTY	% UNDER 5 IN POVERTY	% UNDER 18 IN POVERTY
St. Bernard Parish, LA	16,554	9.2%	$38,478	$18,182	18.5%	33.0%	28.4%
St. Charles Parish, LA	25,152	6.9%	$59,884	$25,216	13.0%	22.0%	17.5%
St. James Parish, LA	9,797	6.8%	$49,883	$21,818	13.2%	21.3%	20.7%
St. John the Baptist Parish, LA	22,281	8.1%	$47,574	$20,921	14.3%	24.1%	20.9%
St. Martin Parish, LA	23,566	6.5%	$39,186	$20,788	16.1%	25.3%	21.3%
St. Mary Parish, LA	22,739	6.6%	$38,269	$19,725	21.5%	36.5%	32.3%
St. Tammany Parish, LA	105,070	5.2%	$59,804	$28,587	10.3%	13.5%	13.1%
Tangipahoa Parish, LA	51,174	8.7%	$38,067	$19,608	22.0%	36.6%	30.3%
Terrebonne Parish, LA	48,732	5.4%	$47,338	$22,513	16.9%	27.1%	24.8%
Vermilion Parish, LA	24,088	4.3%	$40,785	$20,108	18.5%	26.8%	26.0%
Louisiana Shore-adjacent Parishes Total	1,009,683	7.4%	$46,936	$23,645	16.2%	26.8%	23.7%
State of Louisiana	2,018,591	7.7%	$42,167	$22,535	18.4%	29.8%	26.3%
Hancock County, MS	17,718	7.5%	$44,025	$22,168	14.3%	17.7%	18.7%
Harrison County, MS	81,617	9.0%	$44,570	$22,444	14.8%	25.2%	19.9%
Jackson County, MS	60,328	9.3%	$47,767	$22,256	14.8%	22.5%	21.7%
Mississippi Shore-adjacent Counties Total	159,663	9.0%	$45,454	$22,342	14.8%	23.5%	20.5%
State of Mississippi	1,286,435	9.4%	$36,796	$19,534	21.4%	34.1%	30.2%
Baldwin County, AL	78,695	5.6%	$48,918	$26,197	11.9%	22.3%	19.4%
Mobile County, AL	183,772	8.5%	$40,476	$21,274	19.1%	35.0%	28.9%
Alabama Shore-adjacent Counties Total	262,467	7.7%	$44,697	$22,741	17.0%	31.6%	26.3%
State of Alabama	2,102,604	7.9%	$41,216	$22,732	16.8%	27.8%	23.7%
Bay County, FL	76,343	6.6%	$46,240	$24,858	12.5%	17.3%	18.9%
Calhoun County, FL	4,538	8.5%	$29,642	$14,506	20.5%	36.9%	27.6%
Charlotte County, FL	57,707	9.0%	$44,639	$27,561	9.5%	21.0%	15.9%
Citrus County, FL	48,694	10.1%	$37,807	$22,714	13.6%	28.6%	21.7%
Collier County, FL	131,487	6.6%	$58,133	$36,942	10.8%	22.7%	18.2%
DeSoto County, FL	14,130	8.8%	$37,226	$17,187	20.7%	41.3%	31.2%
Dixie County, FL	4,785	7.9%	$31,426	$15,504	19.6%	27.5%	27.9%
Escambia County, FL	135,044	8.8%	$43,148	$23,154	15.5%	28.1%	24.1%

Table A-6. Summary of 5-Year Estimates (2005-2009) of Labor Force, Employment, Income and Poverty Data

GEOGRAPHIC AREA	CIVILIAN LABOR FORCE[A]	% UNEMPLOYED	MEDIAN HOUSEHOLD INCOME	PER CAPITA INCOME	POPULATION FOR WHOM POVERTY WAS DETERMINED		
					% IN POVERTY	% UNDER 5 IN POVERTY	% UNDER 18 IN POVERTY
Franklin County, FL	4,786	9.8%	$38,436	$22,924	23.8%	46.3%	35.6%
Gadsden County, FL	18,373	8.7%	$35,423	$17,245	24.6%	37.8%	35.2%
Gilchrist County, FL	7,514	7.2%	$41,048	$18,364	14.7%	27.3%	20.6%
Glades County, FL	4,237	7.0%	$39,260	$19,810	17.5%	36.2%	28.4%
Gulf County, FL	5,952	9.5%	$38,574	$18,754	17.5%	40.3%	30.2%
Hardee County, FL	11,656	9.7%	$38,865	$15,209	22.9%	32.4%	27.7%
Hernando County, FL	63,562	10.3%	$42,457	$22,872	11.1%	16.7%	17.0%
Hillsborough County, FL	589,772	7.3%	$49,594	$27,252	13.5%	20.5%	19.0%
Holmes County, FL	7,196	7.7%	$33,868	$15,545	19.0%	33.5%	26.5%
Jackson County, FL	17,711	9.2%	$36,442	$16,604	21.1%	24.9%	18.5%
Jefferson County, FL	6,336	11.1%	$44,011	$20,323	20.4%	30.9%	26.6%
Lafayette County, FL	2,867	2.8%	$46,551	$16,575	18.0%	20.9%	20.1%
Lee County, FL	253,382	7.6%	$50,362	$30,363	10.5%	19.7%	16.2%
Leon County, FL	141,096	8.1%	$42,889	$25,467	21.5%	23.8%	18.5%
Levy County, FL	15,777	8.0%	$35,294	$18,381	19.1%	35.6%	29.2%
Liberty County, FL	3,384	6.6%	$39,583	$16,157	22.8%	26.8%	18.2%
Madison County, FL	7,729	8.3%	$36,682	$16,486	22.4%	53.4%	39.9%
Manatee County, FL	138,958	7.1%	$47,935	$28,418	11.7%	21.4%	19.0%
Marion County, FL	126,749	9.0%	$40,306	$22,407	13.9%	31.5%	22.5%
Monroe County, FL	38,269	4.2%	$54,946	$36,086	10.3%	14.0%	10.7%
Okaloosa County, FL	82,135	5.8%	$53,741	$28,361	10.4%	18.3%	16.4%
Pasco County, FL	197,638	8.4%	$43,690	$23,811	11.7%	17.3%	16.2%
Pinellas County, FL	430,241	6.4%	$44,838	$28,872	11.6%	20.2%	16.7%
Polk County, FL	248,938	7.2%	$44,043	$22,283	14.4%	26.5%	21.8%
Santa Rosa County, FL	68,183	7.9%	$54,250	$24,700	10.3%	17.8%	15.6%
Sarasota County, FL	152,438	7.6%	$49,013	$32,768	9.8%	19.2%	15.4%
Sumter County, FL	24,436	9.1%	$41,010	$22,314	14.9%	27.3%	22.7%
Suwannee County, FL	15,622	8.4%	$34,157	$17,798	17.9%	28.5%	27.1%
Taylor County, FL	8,578	11.5%	$35,900	$17,248	22.9%	36.1%	33.6%
Wakulla County, FL	14,379	7.1%	$52,353	$22,114	13.1%	16.4%	18.4%
Walton County, FL	23,982	8.0%	$46,159	$27,125	13.1%	23.4%	20.3%
Washington County, FL	9,405	11.3%	$35,090	$17,850	21.0%	28.4%	27.9%

Table A-6. Summary of 5-Year Estimates (2005-2009) of Labor Force, Employment, Income and Poverty Data

GEOGRAPHIC AREA	CIVILIAN LABOR FORCE[A]	% UNEMPLOYED	MEDIAN HOUSEHOLD INCOME	PER CAPITA INCOME	POPULATION FOR WHOM POVERTY WAS DETERMINED		
					% IN POVERTY	% UNDER 5 IN POVERTY	% UNDER 18 IN POVERTY
Florida Shore-adjacent Counties Total	3,214,009	7.6%	$42,376	$26,560	13.0%	22.5%	19.1%
State of Florida	8,490,304	7.6%	$47,450	$26,503	13.2%	21.1%	18.3%
Shore-adjacent Counties and Parishes Total	7,470,769	7.4%	$43,777	$25,322	15.4%	26.2%	22.8%

[a] Civilian Labor Force and % unemployed statistics apply to the population aged 16-64.

Note: for state Shore-adjacent Counties and Parishes totals, median household income represents an average of the median household incomes for all counties in the shore-adjacent counties and parishes within that state.

Data Source: U.S. Census Bureau 2011; ACS 2005-2009. Data are current as of October 2012.

Table A-7. Summary of 5-Year Estimates (2005-2009) of Educational Attainment

GEOGRAPHIC AREA	POPULATION 25 YEARS AND OLDER		
	% WITH HIGH SCHOOL DIPLOMA	% WITH BACHELOR'S DEGREE	% WITH ADVANCED DEGREE
Texas Shore-adjacent Counties Total	77.4%	24.8%	8.4%
State of Texas	79.3%	25.4%	8.3%
Louisiana Shore-adjacent Parishes Total	80.1%	20.9%	6.9%
State of Louisiana	80.5%	20.6%	6.8%
Mississippi Shore-adjacent Counties Total	83.8%	19.2%	6.8%
State of Mississippi	78.9%	19.1%	6.7%
Alabama Shore-adjacent Counties Total	83.8%	21.9%	7.5%
State of Alabama	80.8%	21.5%	7.8%
Florida Shore-adjacent Counties Total	85.5%	23.9%	8.4%
State of Florida	84.9%	25.6%	9.0%
Shore-adjacent Counties and Parishes Total	82.0%	23.6%	8.1%
Data Source: U.S. Census Bureau 2011; ACS 2005-2009. Data are current as of October 2012.			

Table A-8. Summary of 5-Year Estimates (2005-2009) of Language, and Birthplace Data

GEOGRAPHIC AREA	POPULATION 5 YEARS AND OLDER				% NATIVE BORN
	% SPEAKING ONLY ENGLISH AT HOME	% SPEAKING SPANISH AT HOME	% SPEAKING FRENCH AT HOME	% SPEAKING OTHER LANGUAGE AT HOME	
Texas Shore-adjacent Counties Total	61.7%	32.4%	0.4%	5.6%	80.0%
State of Texas	66.4%	28.9%	0.3%	4.5%	84.2%
Louisiana Shore-adjacent Parishes Total	89.9%	3.9%	3.6%	2.6%	95.9%
State of Louisiana	91.6%	2.9%	3.4%	2.1%	96.9%
Mississippi Shore-adjacent Counties Total	94.2%	2.8%	0.4%	2.7%	96.1%
State of Mississippi	96.4%	2.1%	0.2%	1.3%	98.1%
Alabama Shore-adjacent Counties Total	95.4%	2.2%	0.2%	2.2%	97.0%
State of Alabama	95.6%	2.6%	0.2%	1.6%	97.1%
Florida Shore-adjacent Counties Total	85.0%	10.0%	0.5%	4.5%	89.3%
State of Florida	74.2%	18.9%	0.7%	6.3%	81.3%
Shore-adjacent Counties and Parishes Total	77.8%	16.8%	0.9%	4.5%	87.2%
Data Source: U.S. Census Bureau 2011; ACS 2005-2009. Data are current as of October 2012.					

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